COAL AGE

A McGRAW-HILL PUBLICATION

OCTOBER, 1958 PRICE $1

Management Approach . . . . . North American Coal

Cost Control . . . Lorado Coal Mining

Deep Mining . . . Pecks Run Coal Co.

Strip Mining . . . . Gilberton Coal Co.

Services . . . . . Inland Steel Co.

Preparation . . . Jeddo-Highland Coal

Safety . . . . . Colorado Fuel & Iron

PLUS . . .

Basic Approach and Benefits

Opportunities in Coal

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In this October issue, Coal Age re-emphasizes the benefits and re-maps the payoff approaches in coal-mine modernization.

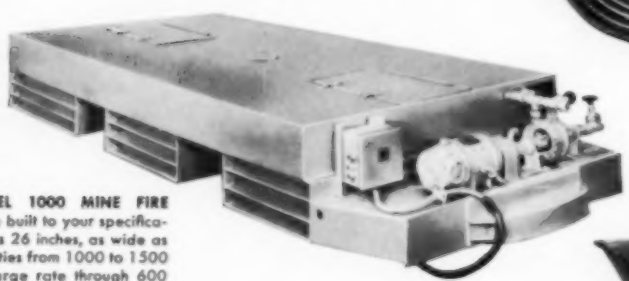
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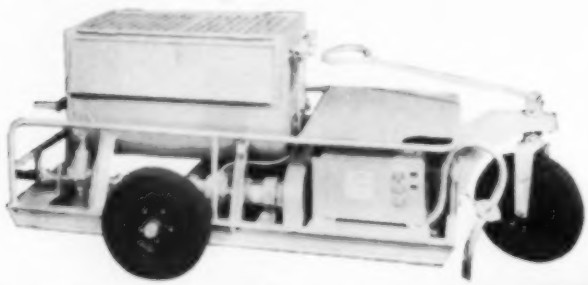
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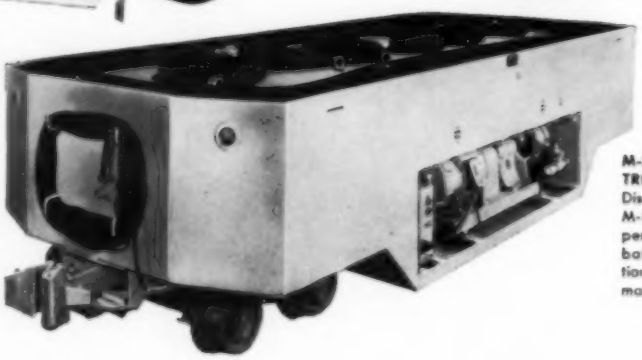
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This threat to human lives and vital mining equipment, however, can be greatly reduced. You can do it with one or more of the indispensable items described above.

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A washing machine that uses sand instead of soap

B. F. Goodrich improvements in rubber brought extra savings

Problem: A torrent of sand and water —15,000 gallons every minute—circulates in and out of that cone-shaped tank. It's a huge washing machine in a coal mine that makes sure users get all coal, no unburnable rocks in their furnaces. As coal swirls through this thick mixture of sand and water, rock and shale sink to the bottom, are drained out. The coal, being lighter, is skimmed off the top.

But how to pipe the sandy mixture in at different levels was a problem. It would wear holes through metal pipe in no time.

What was done: Company engineers remembered that a rubber hose developed by B.F.Goodrich had given unusually good service handling rough materials in another installation. This hose is made with a special lining of the toughest wear-resisting rubber known. The rubber is so rugged that on many jobs it outlasts the hardest steel 10 to 1.

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B.F.Goodrich ***industrial rubber products***

Questions

We've been asked about the Yieldable Arch



What is the Yieldable Arch?

Bethlehem's Yieldable Arch is made of U-shaped sections rolled from high-strength steel in the 95,000-105,000 psi tensile range. A typical Arch set is built up of three or more segmental lengths which nest at the overlapped ends. Heavy U-bolt clamps hold these ends together, thereby forming friction joints which will yield under excessive pressures. Normally, torque on the bolts is 180-200 ft/lb, allowing Arch to yield at about 40,000-50,000 lb.

Why is the yieldable feature important?

An arch that will yield, such as Bethlehem's Yieldable Arch, gives the overburden a chance to settle slowly into its own natural arch, which then carries the major share of the load. The more the Bethlehem Arch yields, the more the load is transferred to abutments on either side of the opening.

Rigid supports cannot uniformly distribute the dynamic pressures caused by the weight and subsidence of overburden. Sooner or later they "let go," preventing the formation of a natural pressure arch around the mine opening.

In what sizes is the Yieldable Arch available?

Bethlehem rolls two sections of Yieldable Arch: 15 lb and 21 lb per foot. The two sections have almost identical outer contours. The difference lies in the thickness, notably in the top flanges and the base. Sets can be tailor-made to fit mine openings, from a minimum of 6 ft up to 20 ft wide, depending on individual mine conditions.

Where should the Arch be used?

The Yieldable Arch is now being used in both coal and ore mines for haulage roads and drifts, slusher drifts, transfer drifts, or any opening of sufficient size where heavy ground causes spalling or squeezing conditions. This question, of course, can best be resolved by an on-the-spot discussion with a Bethlehem engineer.

What about spacing of Arch sets?

Ground conditions govern the spacing of Yieldable Arch sets, but generally speaking a spacing of 2 to 3 feet in heavy ground is about average. In any situation, the spacing should be such as to ensure that the steel, not the lagging, will do the yielding.

Speaking of lagging, just what is it and why is it important?

Lagging and packing are very important in a Yieldable Arch installation for several reasons. First, to prevent the falling of material into the opening; second, to fill the voids between mine roof and Arch sets; third, to keep the load on the Arches relatively uniform. Lagging can be poles, planks, round or split timbers, or miscellaneous lengths of cut timber. Some mines also use old steel ties and other steel "leftovers."

Does the Yieldable Arch require maintenance?

A Yieldable Arch set is, in the strict sense of the word, a machine. As such, it must be kept operable. If the load becomes evident (as, say, by a sag in the lagging) the Arch must be permitted to yield. U-bolts should be checked for binding; perhaps a blow with a hammer will correct the condition. Torque on the bolts must be properly maintained.

All in all, the Yieldable Arch is a long-service product which will perform satisfactorily with minimum maintenance. When it has outlived its usefulness in a particular location it can be recovered and re-installed elsewhere.

How about cost?

Naturally you'd expect to pay somewhat more initially for a fabricated item like the Yieldable Arch than you would for timbers or other rigid materials. But as soon as the Yieldable Arch is installed, it starts saving you money. Most mine operators who have Arch installations state that the Yieldable Arch pays for itself in remarkably short order; six months is not at all unusual. This, together with salvageability, makes Bethlehem's Yieldable Arch the most economical roof support in heavy ground.

● ***You probably have other questions of a more specific nature to which you would like answers. If so, by all means write us; we will study your questions and reply as promptly as possible.***

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Caterpillar D9 Tractor with No. 9 Ripper powers you to profitable strip mining

Ripping with one tooth of its No. 9 Ripper, D9 makes 100-foot furrows 40 inches apart at Reliance Mine pit.

At the Reliance Mine of the Peabody Coal Company, Clinton, Mo., a thin seam of bituminous coal is being broken up by a CAT D9 Tractor with No. 9 Ripper. In a few hours a day, the D9 rips enough coal in the two Reliance pits to keep them operating all day. The D9 is also used for general bulldozing work.

The No. 9 Ripper comes equipped with a single tooth in the center, but the special design and sturdy construction of this attachment make it possible to add two more —one on either side. When ripping coal a single tooth is used. The tooth pivots 10 degrees to either side to allow easy steering. Ground penetration, down to 28 inches. The No. 9 Ripper teeth are made of alloy steel with replaceable tips.

Caterpillar Dealers also offer the single-tooth Kelley Ripper on the D9, with depth penetration down to 5 feet; a new and proven combination for thick seam coal.

The D9 has the power for a profitable ripping operation —260 HP at the drawbar, 320 HP at the flywheel. It has heft — over 36 tons of operating weight with bulldozer. It's maneuverable — hydraulic boosters provide easy steering, braking and clutching. Yet it will not break up the coal because of low ground pressure tracks.

To match your needs, the D9 is available with torque converter or direct drive with oil clutch. For complete information, see your Caterpillar Dealer. He has the facts and figures on the D9's performance on mining operations. And he'll be glad to give you an on-the-job demonstration.

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This Month in COAL AGE

OCTOBER 1958

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► Modernization

How Modern Is American Industry? ... *p 74*

McGraw-Hill Dept. of Economics finds a need for business expenditures of $95 billion in U. S. industries to replace obsolete facilities with the best new plant and equipment. Business is not prepared today to answer the challenges posed by the economic offensive of the Communist bloc, the expectations of our people for a continuously rising standard of living and the competitive situations of individual firms.

► Management Planning

Modern Management Methods
Pace North American Growth ..... *p 78*

North American Coal Corp.'s rise to prominence as the ninth largest commercial producer of bituminous coal reflects no magic or miracles. Rather the experience shows how careful, long-range management planning can integrate all phases of production to serve total company growth. This means acquiring properties and introducing equipment which have the greatest cost-reducing and profits-producing potentials; coordinating sales development with mine and market locations; building a strong reserves position; reducing mine-to-market costs; expanding working capital; improving personnel performance; developing new and improved products; and implementing the broad concept of public relations.

Featured—Picture-panel of six key corporation executives; checklist on "Management Modernization."

► Industrial Engineering

Cost Control ..... *p 86*

By using an industrial-engineering approach Lorado Coal Mining Co. achieved a 40% increase in tons per man and a 25% cut in mining costs in less than 3 yr. First goal was the establishment of production standards based on time-study results. On the basis of these studies the company revised mining methods to maximize loading with a minimum of supporting labor. The plan includes provisions for frequent reappraisals to keep standards up to date. Incentive system has been worked out to reward supervisors for above-standard performance. Heads of departments also may earn bonuses amounting to a maximum of 30% above base pay.

For Your Information—Time-study sheets and report forms used to administer the program.

► Deep Mining

Raising Productivity
By Updating Mining Methods ..... *p 92*

Modernizing to meet the challenge of changing market conditions while keeping pace with a constantly rising wage scale has marked the 41-yr history of the Pecks Run Coal Co. As a result of applying new ideas and modern machinery, productivity is 66% above the national average for all manufacturing. Today Pecks Run produces 19.3 tons of clean coal per man, excluding supervisory and clerical employees. This output is achieved with boring-and ripper-type continuous miners working in the 50- to 72-in Redstone seam.

Sidelights—Continuous-mining plan for room panel; graphs showing relation between productivity, wages and capital expenditures.

(*Continued on p 7*)

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► Stripping

Gilberton Coal Tools Up For Modern Stripping . . . . . *p 100*

A $2½-million investment in capital equipment in the past 3 yr extends Gilberton Coal Co.'s stripping range and streamlines production and service operations for the years immediately ahead. New equipment units include 32-yd dragline, largest in the anthracite region, modern drills for making large-diameter blastholes and high-capacity front-end loader to up-date coal loading. Switch to ammonium-nitrate blasting aids in extending range.

Helpful Idea—In areas where vibration is a problem, charges are decked with milli-second delays.

► Underground Haulage

New Mine Cars Cut Haulage Cost 33% . . *p 108*

Installation of new 262-cu-ft mine cars to replace 90-cu-ft units at Inland Steel's mines resulted in a 33% reduction in haulage cost and a 5% cut in over-all mining cost. At this rate of saving, the company expects to recover the investment in 2½ to 3 yr. Other benefits include safer haulage, faster trip speeds.

Extras—Comparison of new and old cars; how the changeover was made.

► Coal Preparation

Jeddo-Highland Fine-Coal Plant Opens New Market Opportunities . . . . . *p 116*

New fine-coal plant on the site of an old cleaning plant which was dismantled is designed to recover coal for metallurgical and power-generation uses from silt-basin raw material. Cleaning and conditioning processes include laundering, tabling, classification, froth flotation and cyclone thickening. Quality of raw material in basins varies in different zones, which created a problem of providing a uniform feed for the plant. The solution was to use a large scraper to pick up feed from different zones, thus blending while loading.

(Continued on p 9)

This Month in COAL

HOW MUCH OVER 400?—Appalachian Coals, Inc., may yet win the medal for the best job of forecasting the level of bituminous coal output in a 1958 period. Back in August ACI opined as follows: "Weekly coal production will not exceed year-ago figures again before Nov. 15. In that 1957 week, output dropped to 9,099,000 tons. . . ."

The continued slow rate of output in September, reflecting the delay in extension of the business pickup to coal, confirmed the ACI stand and forces a further readjustment of previous forecasts for the year. Now it appears that if bituminous exceeds 400 million by only a few million it may be doing well. It can do better than well only if business shows a much faster pickup than now seems likely.

PRICE SATISFACTION—Though there were and still are scattered complaints about price-cutting, the industry continues to find benefit in a satisfactory price situation for the first time in any recession. In fact, a firming began to be noticeable in August and the tendency is more pronounced now. Aside from protecting the profit position, one reason for maintaining a good price level is the possibility of reimposition of emergency controls. At the moment, this is a rather remote possibility but nevertheless an added reason for protecting profit margins by continuing to hold firm against price pressures.

OIL IMPORTS—Though the level still is unsatisfactory to coal and to domestic oil producers, the voluntary program for controlling oil imports continues to keep the crude level under that of 1957. At the moment, following a redetermination of individual quotas, the prospects are that levels will stay under government ceilings, or at a rate of around 13% of domestic crude production. The big loophole still remains, however, the lack of restriction on products.

COAL EXPORTS—Down from 76 million in 1957, including Canada, to a little over 50 million in 1958 is the picture in bituminous exports. Recessions abroad are a big part of the answer, in turn enabling foreign producers to fill a bigger part of the gap and leading to growth in pithead stocks and agitation for curbing imports, reflected in imposition of such curbs by Germany, as an example, in September.

Outlook for 1959: At the moment, still slow—at least for the remainder of the coal year. Longer term: Still basically good.

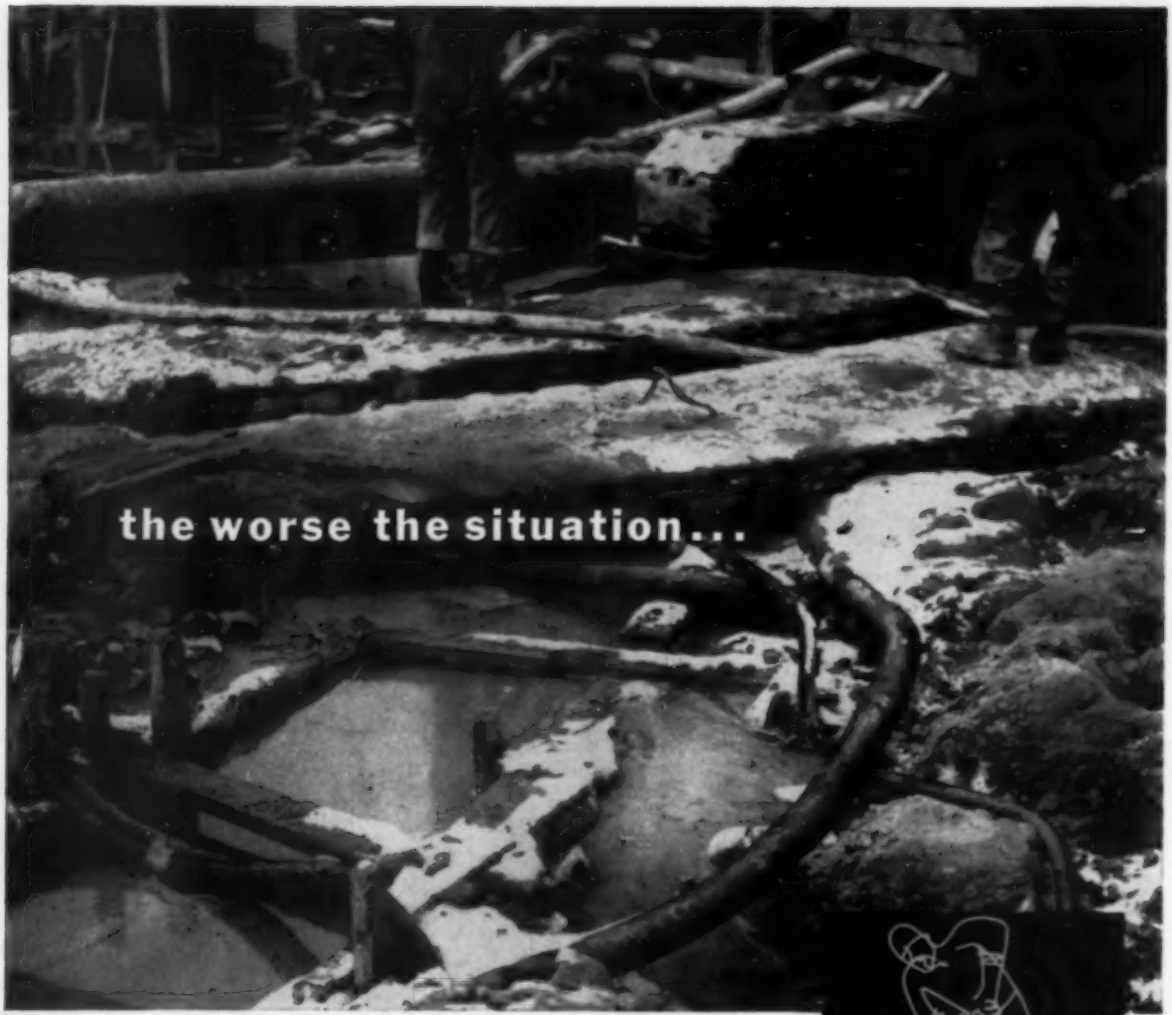
AND SOME OTHER RESULTS—Because coal men sometimes wonder about whether they are getting anything for their money and effort, it is perhaps worth referring to the experience of Tom Pickett, NCA executive vice president, in August. He was in a TWA plane over Ohio when the pilot reported that they were in strip-mining country and over the start of the world's first operating coal pipeline.

Conclusion: Working hard enough and long enough as, in this instance, in public relations, eventually brings a payoff.

Footnote: The pipeline continues to operate, delivering its daily quota on a 15-yr 18-million-ton contract placed with Consol by Cleveland Electric Illuminating.

This Month in Coal Age—Cont'd

This Month in COAL

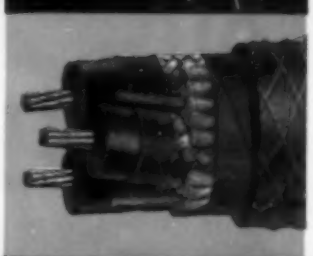


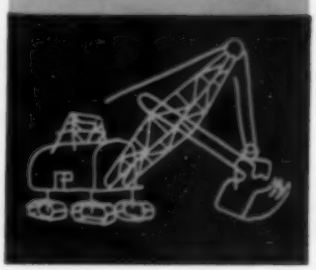
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This Month in Coal Age—Cont'd

Highlights—Analyses of plant feed and products; complete flowsheet of plant circuits.

► Safety

Accident-Scene Photographs: Effective New Tool in Safety Drive ..... *p 124*

Since March, 1957, Colorado Fuel & Iron Corp., Pueblo, Colo., has taken a new approach to accident prevention by reconstructing as nearly as possible the conditions at the time of the accident and then taking photographs. These pictures are published in the company's monthly safety bulletin and displayed on bulletin boards. Effectiveness of the new approach shows up in the sharp improvement in the company's safety record since the method has been in effect. For example, frequency was 11.59 in 1955, 6.30 in 1957 and 7.57 through April, 1958. Severity dropped from 3,499 in 1955 to 199 in 1957 to 50 through April.

Features—Photos of reconstructed accidents; how CF&I goes about getting the photos.

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This Month in Mining Practice

CONTINUOUS METHODS—The growing number of miners able to produce consistently and at high rates from the thinner seams brings the operators of such seams more and more to the question of the basic approach. The advent of continuous mining in the thicker coals was one of the big factors in accelerating the swing to pillaring. Will the tendency be to increase the percentage of pillar recovery in the thinner veins, where the percentage hitherto has been less, as a rule, than in the thicker? So far, the answer seems to be "Yes." With this trend is also the trend toward "continuous projections," where the character of the work is substantially the same whether "rooms" or "entries" are being operated. And bleeder openings are now practically standard regardless of the basic projection.

AC AND MAINTENANCE—Breakdown prevention and repair of equipment has jumped up to first place in the list of major coal-mining problems, reflecting, of course, the rise in the use of machines. It now appears that one of the advantages of AC—lower maintenance—is being realized in practice at those deep mines completely on AC or using AC for face equipment. Though other advantages possibly outweigh those of maintenance, the latter now is becoming a more prominent consideration in the change to AC.

FOR BETTER PREPARATION—How well the equipment functions in coal cleaning and sizing reflects not only the design and operation of the equipment itself but also the closeness and the accuracy of controls. New devices and products for this purpose include such things as gamma-ray equipment for checking on the pulp density of flotation feed, and float-and-sink solutions that maintain their calibration for much longer periods of time and thus insure continued accuracy in results, without which precise control is impossible.

And to prevent one form of coal loss—new resin-base sprays to form protective crusts on fine coal in cars or stockpiles to keep it from being blown away.

METHANE DRAINAGE—Reports from Great Britain and the Continent continue to tell of the growth of methane drainage by boreholes ahead of the face—and of the use of the product in power plants or in city gas systems. This growth reflects improvements in equipment and techniques, and the major goal is of course safer conditions in the working areas. Whether such methods will be employed in the U. S. still is to be determined. But with the growing gas problem accompanying continuous mining, drainage might be quite helpful in some properties.

Sidelight—The Russians claim that geophones inserted in boreholes in the roof rock give them information which enables them to forecast gas outbursts.

AERIAL BELTS—One of the earlier applications forecast for the rope belt was aerial installation on the outside. This is now an actuality, the conveyor being supported between pairs of poles by means of the ropes.

Installation Hints: Provide walkways for service; protect belt against wind.

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The Coal Commentator

Growing Problem

The bump, though it has long been a factor in mining, can almost be counted, nevertheless, as a latter-day phenomenon, particularly in coal. This results from the fact that bumps are now relatively frequent, rather than infrequent, and are much more widespread.

The conditions that cause a bump are several and varied, but a general one is strong, thick layers of roof and bottom rock next to the coal. Where softer layers—shale, for example—are next to coal the tencency to bump is materially reduced.

Another factor is increased speed of extraction with machines, with its accompanying concentration of operations. In contrast to the leisurely progress of hand loading, mechanical loading and continuous mining sharply reduce the time provided for settlement and gradual dissipation of stresses. Instead, they tend to build up quickly to extra magnitudes, increasing the chances of sudden pillar destruction.

Conclusion: Mine operators will have to keep more and more in mind the possibilities of weight buildup and bumps in both development and pillaring.

Breakthrough Nearer

Five and one-half months and 16¾ million tons without a fatality is the safety record hung up by Illinois in the period that ended Aug. 14 this year. It is a record that will be hard to beat, but the fact that it has been made is ground for concluding that it can be exceeded. This conclusion, and the second more-general one that a breakthrough can be made in accident reduction in coal is reinforced by reports of gains in other areas also.

Roof falls and transportation will remain the big targets in safety work in mining, and the major remedies will continue to include training in accident prevention and promotion of safety consciousness.

Illinois certainly is doing its part to lead the way and to show that the safety breakthrough can be attained by constant pressure and attention to basic principles.

How Big . . . How Soon?

Raising unit productivity is a function, first, of increased capacity. A second major ingredient is more power for a faster cycle, thus multiplying the benefits of the increase in capacity.

The workings of these principles are evident in facilities for both deep and strip mining in coal. The past few months in stripping, for example, have been characterized by a stream of announcements of bigger trucks and bigger bodies and engines for stripping, as well as higher-capacity longer-reach excavating equipment, higher-footage overburden drills, and so on. Benefits, in addition to labor economies and reduced maintenance include, in some instances at least, lower investment cost, for the same output.

One question that might be asked is: "How big . . . and how soon?" Answer, for stripping: 100-cu yd shovels and 100-ton haulers in less than 5 yr.

Well Done

Though not so few, the number of coal-mining organizations with a record of a century of service is not so large, either. Thus, the attainment of the century mark is an accomplishment worth noting. Jeddo-Highland this year has earned this distinction.

Even more worthy of note is the fact that the organization still is operated by members of the family of the founder—George B. Markle, who organized G. B. Markle & Co. in 1858 and, equally significantly, developed the breaker and thus revolutionized sizing and cleaning in the burgeoning hard-coal industry. The Jeddo-Highland name was adopted in 1921, and the pioneering work continued under the guidance of Mr. Markle's descendants, including Donald Markle Sr. and Jr., today's president and vice president.

Jeddo-Highland continues in business and looks forward to a future of continued service. It and its management have certainly earned a hearty "Well done!" as they start on their next century.

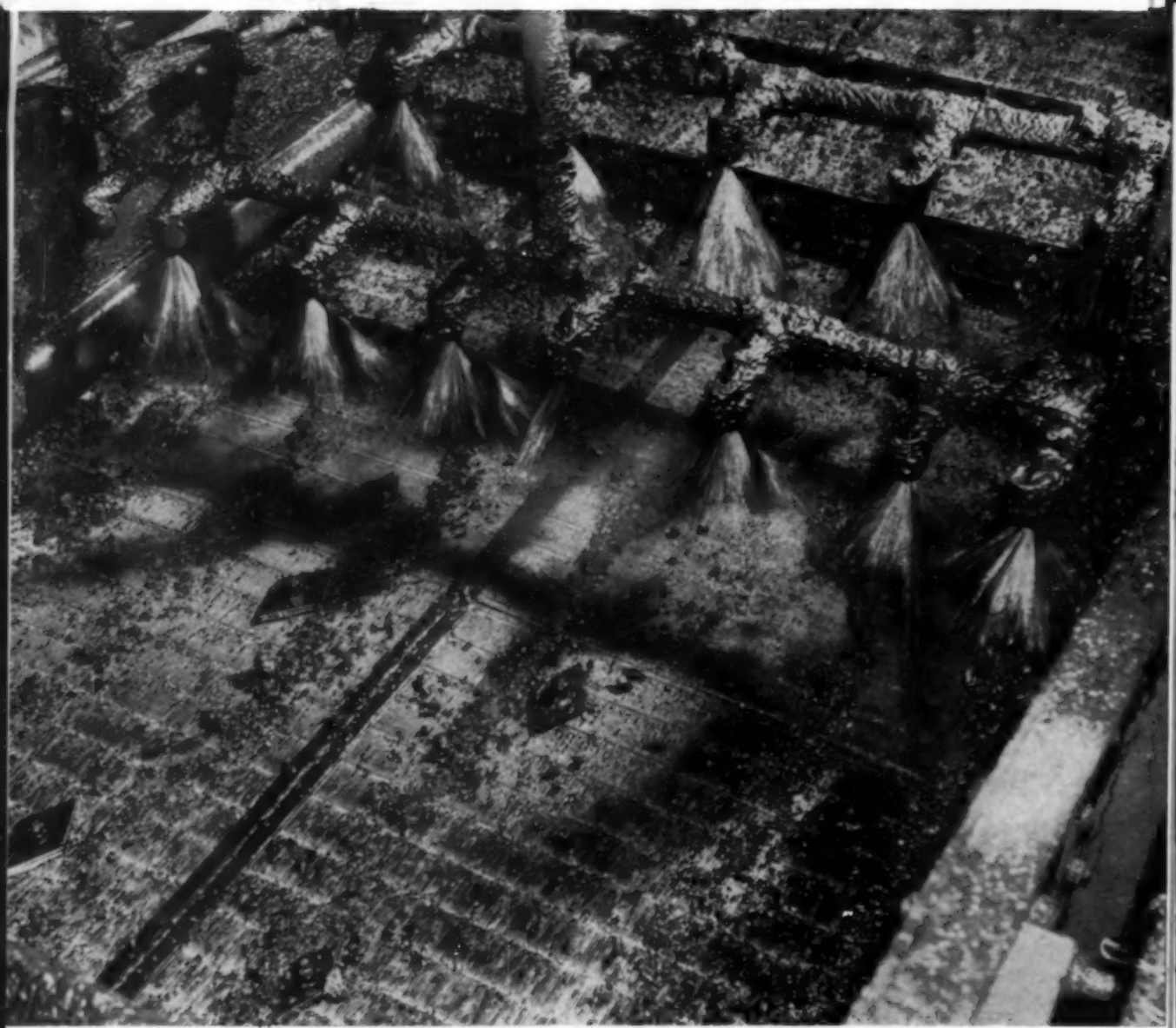
Man in Coal

Coal is the source of many, many things, including fossils. The latest of the latter is the skeleton of a manlike creature uncovered in the Bacinello coal mine near Grosseto, Italy.

The date was Aug. 1 and the size of the pre-civilization citizen was about 4 ft. This same mine is reported to have yielded other evidences of the early history of man and his predecessors. Prof. Johannes Huerzeler, Swiss scientist, who is in charge of the archeological work at the property, expressed the belief that the skeleton was proof of his theory that man and apes descended from a common ancestor some 60 to 70 million years ago. The specimen found was thought to be over 10 million years old.

As has been said on many an occasion—there are a lot of things you can get out of coal.

Leaders of the Coal Industry confirm



Stainless Steel outlasts other metals 4 to 1

in the grimy life of a coal screen

Tons of coal rattle across this desanding screen every day. It gives excellent results because it's made from Stainless Steel wire. The Stainless will outlast just about any other kind of metal used in coal screens—usually by about a four-to-one margin.

Stainless Steel resists acid corrosion caused by wet coal. It keeps a smooth surface that lets coal slide easily, avoiding production-stopping build-ups. And countless cases where Stainless has replaced other materials prove that it can take more wear than most metals.

If you want longer service from your equipment—flumes, shakers, vibrators, jigs—use Stainless Steel. And if you want service-tested quality, specify USS Stainless Steel. For fast delivery, call your local steel distributor.

USS is a registered trademark.

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Tennessee Coal & Iron–Fairfield, Alabama
United States Steel Supply–Warehouse Distributors
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USS **United States Steel**

another continuous mining advance . . . newest

Leaders of the Coal Industry confirm that H & P Fine Coal Preparation Plants need only ONE operator



H & P Control Center. Central location gives the single operator simplified control of the coal preparation plant.



C. E. WALKER
Jewell Ridge Coal Corporation



N. T. CAMICIA
Island Creek Coal Company

Modern coal cleaning methods have lifted the Coal Industry above the level of guess work. The scientific, controlled approach raises the standards of coal preparation, benefiting coal producers and coal users alike. Heyl & Patterson has contributed to this progress through new machinery and new methods. Now, a third dimension has been added by designing push-button controlled Fine Coal Preparation Plants requiring only a single operator. Obviously, great economies result from this combination of carefully engineered lay-out and properly applied equipment.

Mr. N. T. Camicia, Vice President and General Manager of Operations, Island Creek Coal Company, confirms that his 140 TPH Fine Coal Preparation and Thermal Drying Plant at Bradshaw #6 Mine, runs smoothly and efficiently with one man at the controls.

Mr. C. E. Walker, Executive Vice President of Jewell Ridge Coal Corporation, has the same experience at Melville #9 Mine, washing 80 TPH.

Among other Fine Coal Preparation Plants built by Heyl & Patterson and requiring only one operator are Hampton #3 Mine of the Westmoreland Coal Company, which has a capacity of 150 TPH, and Blue Bird Coal Company's #8 Mine, which handles about 70 TPH.

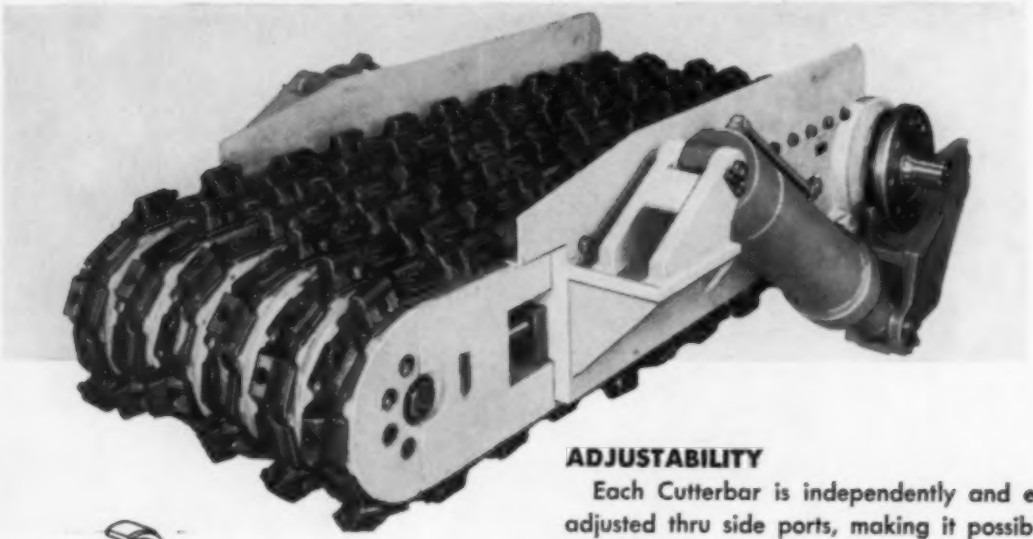
For complete information, call in an H & P Contracting Engineer, or request bulletin 557.

Heyl & Patterson INC.

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another continuous mining advance . . . newest

Bowdil MULTI-BAR RIPPER HEAD

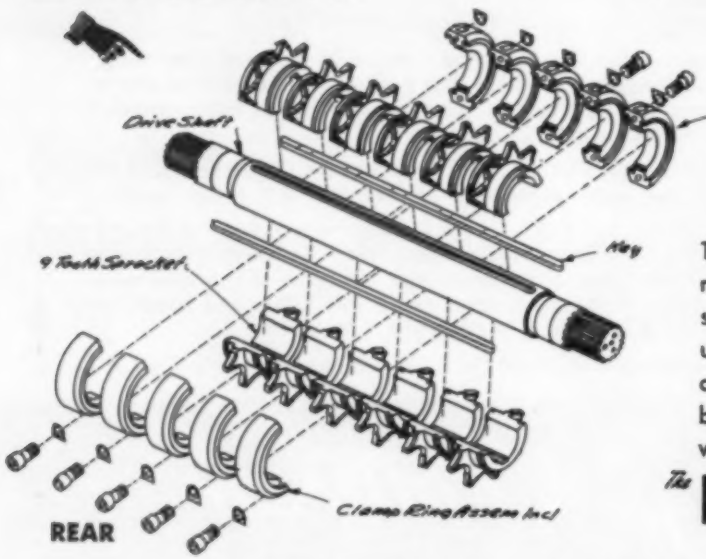


IMPROVED

special hard-surfaced Wearing Shoes used in heads of the Cutterbars eliminate maintenance on roller and bearings as formerly used.

REAR OF THE RIPPER HEAD FRAME

Sprockets are clamped to an oversize Shaft, locking Shaft and Sprockets into an integral unit equivalent in strength to a 9" diameter Shaft . . . completely eliminating deflection, the chief cause of bearing failure.



ADJUSTABILITY

Each Cutterbar is independently and easily adjusted thru side ports, making it possible to retain equal tension on all chains at all times.

INTERCHANGEABILITY

All chains are similar in kerf and lacing arrangement for interchangeability as desired. All sprockets are also interchangeable. Chains may be run with or without renewable liners in the Cutterbars to suit your conditions.

RIPPER HEAD ASSEMBLY

includes a special improved design Head Drive Shaft and Sprocket Assembly which makes it possible to renew a sprocket IN MINUTES without removing the Shaft . . . two-piece sprockets, held on the Double Keyed Shaft by special design Resilient Clamping Collars, maintain extreme tension to the Shaft.

► **DEPENDABILITY**

This design MULTI-BAR RIPPER HEAD is made from high grade alloy heat-treated steels. It has been, like all Bowdil products, thoroughly tested under severest conditions over a long period of time before announcement. This is in keeping with the standards of

The **BOWDIL** COMPANY
CANTON 1, OHIO

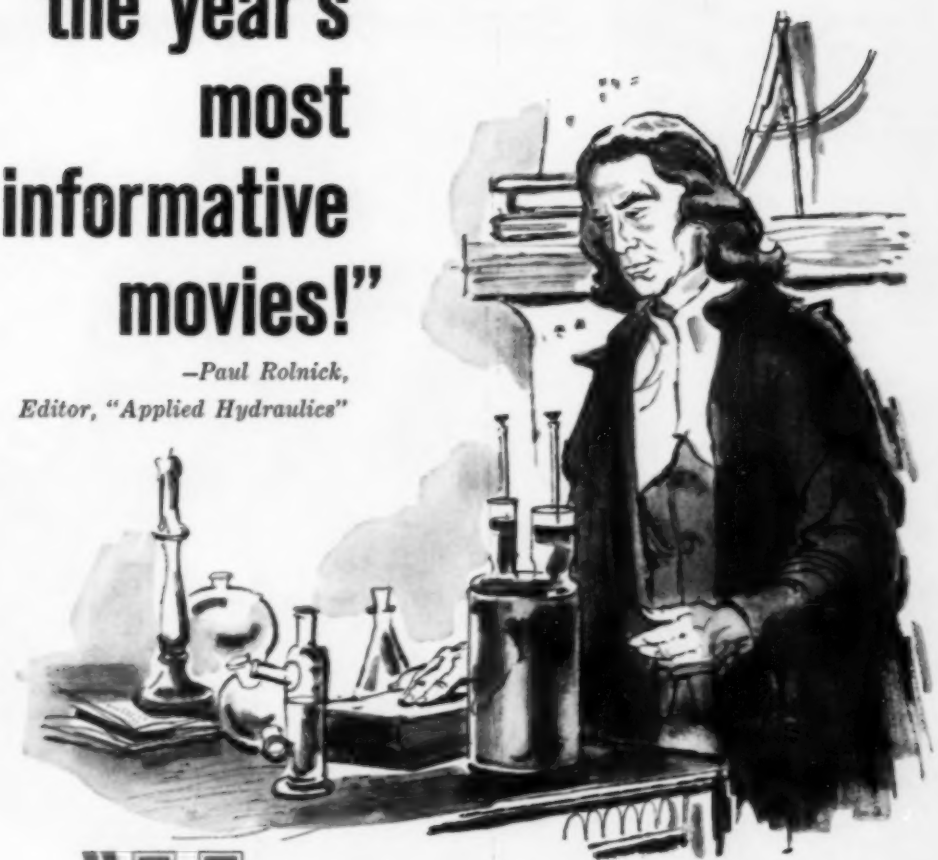
► *For illustrative information of this unit, write or call the factory: GLendale 6-7176*

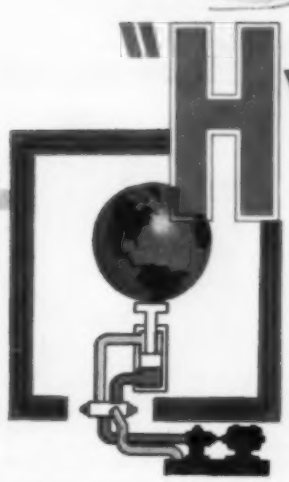
1st &

★ ★ ★ ★

"One of the year's most informative movies!"

–Paul Rolnick,
Editor, "Applied Hydraulics"





"HYDRAULICS"

You are there when Pascal discovers the hydraulic principles . . . you see today's more common hydraulic problems, *your* problems, solved—right before your eyes! This 16mm color and sound movie will make your decisions easier . . . because it gives *you* valuable information. This is the movie you can't afford to miss. (Running time, 25 minutes.)

For information regarding FREE SHOWING to your plant or organization, write Hydraulic Film, Room 2006, The Texas Company, 135 E. 42nd Street, New York 17, N. Y.

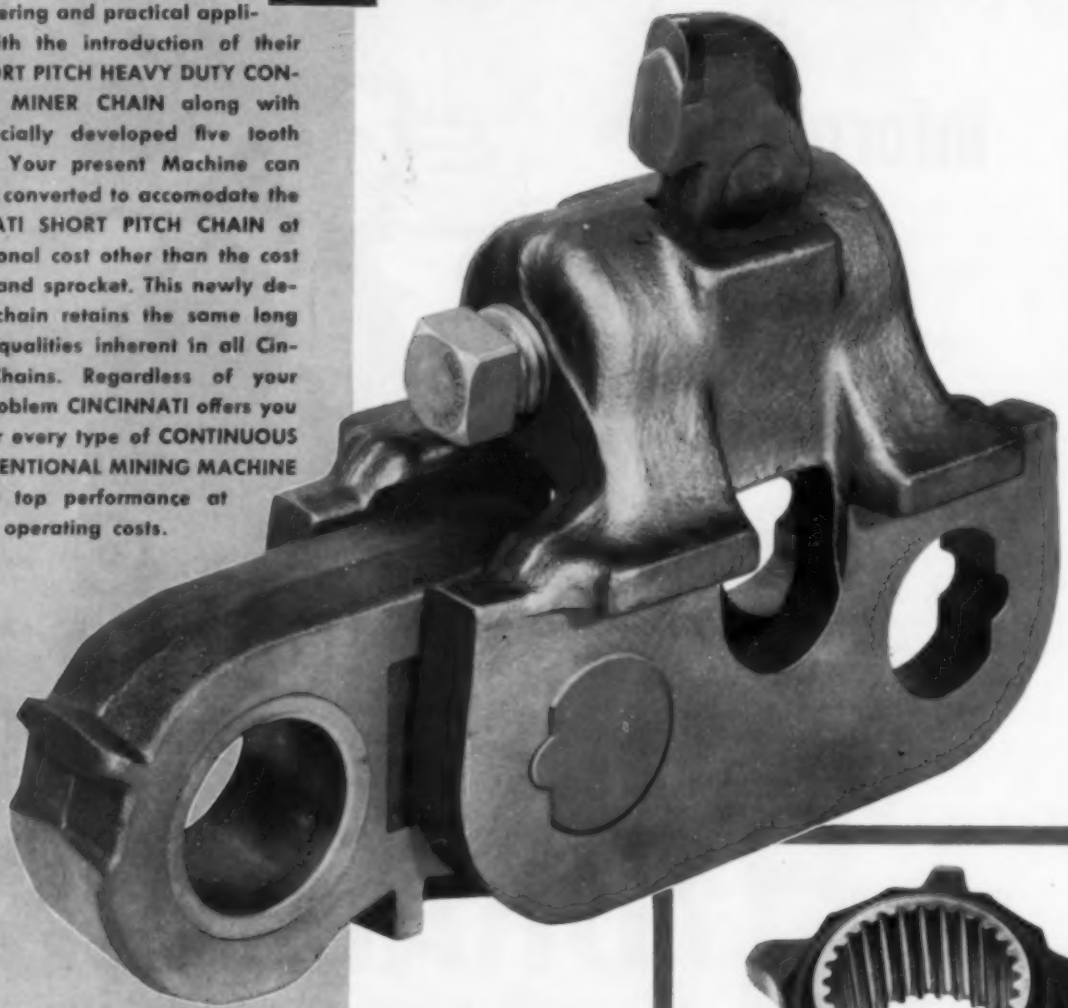
TEXACO

LUBRICATION IS A MAJOR FACTOR IN COST CONTROL

Another 1st for CINCINNATI MINE

the new short pitch (HEAVY DUTY) continuous miner chain!

Once again CINCINNATI MINE has developed another FIRST in engineering and practical application with the introduction of their NEW SHORT PITCH HEAVY DUTY CONTINUOUS MINER CHAIN along with their specially developed five tooth sprocket. Your present Machine can easily be converted to accomodate the CINCINNATI SHORT PITCH CHAIN at no additional cost other than the cost of chain and sprocket. This newly developed chain retains the same long wearing qualities inherent in all Cincinnati Chains. Regardless of your cutting problem CINCINNATI offers you chains for every type of CONTINUOUS OR CONVENTIONAL MINING MACHINE that give top performance at minimum operating costs.





CINCINNATI'S SPECIALLY DEVELOPED FIVE TOOTH SPROCKET

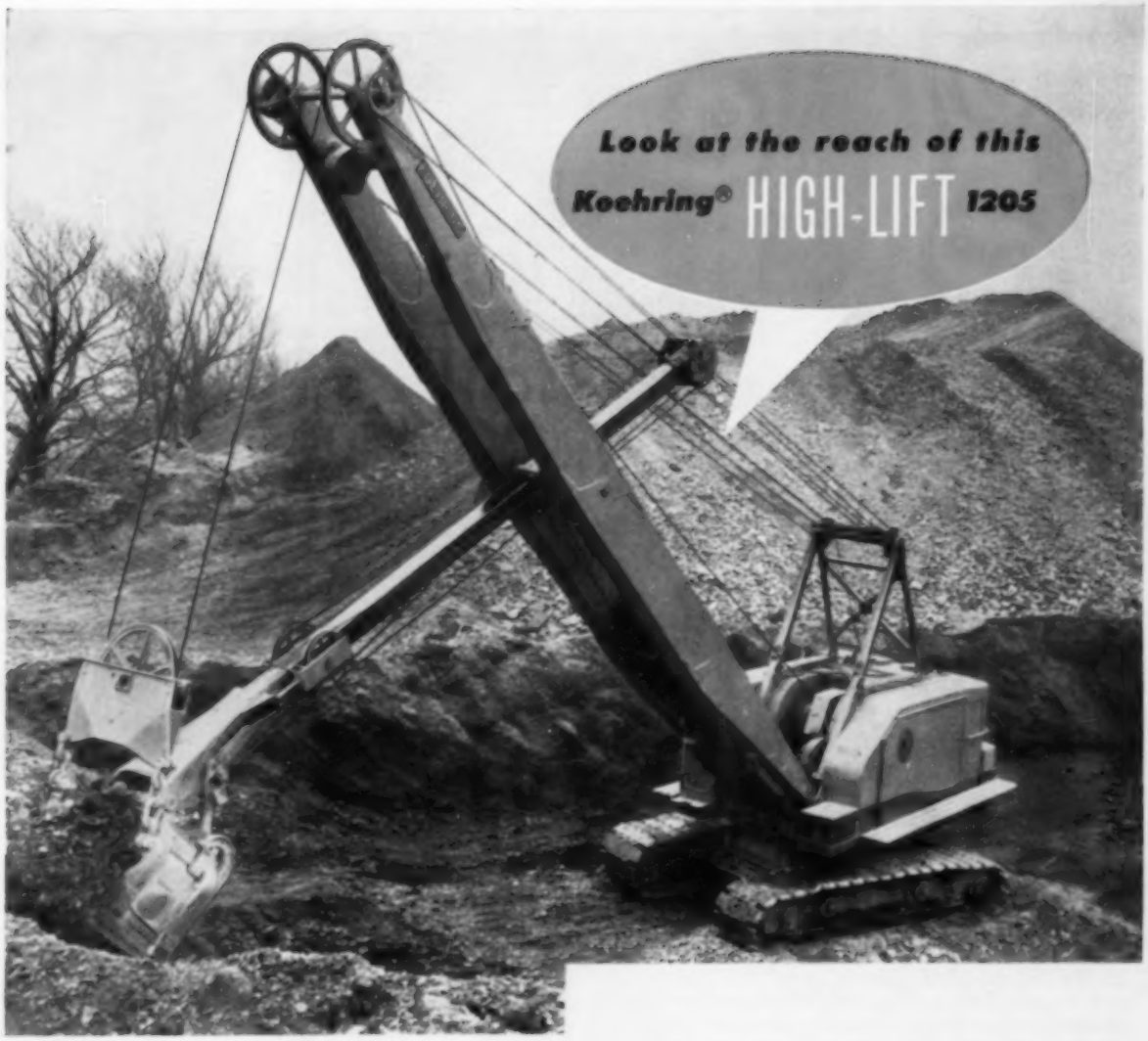
This five tooth CINCINNATI SPROCKET with its supporting ledges on both sides of teeth stabilizes chain and machine, thereby reducing wear on both chain and machine.

the

CINCINNATI MINE MACHINERY CO.

CINCINNATI 25, OHIO

Specialists in cutting equipment for over 34 years





A Koehring 605 dragline strips 35 to 45 feet of overburden at this Mid-West mine. This size machine handles 1½ to 2½-yard dragline or clamshell bucket on wide work radius. The 605 is convertible to a 36-ton lift crane — or 1½-yard shovel (22-foot standard boom or 28-foot high-lift boom).

Here's a heavy-duty shovel in the 2½ to 3-yard class that really puts coal stripping on a long-reach basis! For instance — when equipped with a 2½-yard dipper on 50-foot high-lift boom (above) this big Koehring 1205 has 51-foot-4-inch cutting height at 45° boom angle — and dumps at a height of 40-feet-10-inches. The high-lift 1205 shovel also handles a 3-yard dipper on a 40-foot boom — and gives you 42-foot-10-inch cutting height, and 31-foot-5-inch dumping height, at 45° angle. (For heaviest digging, there's a standard 1205 with 3-yard dipper on 30-foot boom.)

Power, strength and load-stability as a shovel increase the 1205's work capacity with every attachment. Depending on weight of materials, it handles 3 to 4-yard dragline or clamshell buckets on 60 to 170-foot boom. As a crane, it safely lifts up to 95 tons (based on 75% rating). Your Koehring distributor has more information that will interest you. Call him *today*, or write us for 1205 catalog.

KB44

KOEHRING DIVISION OF KOEHRING CO. Milwaukee 16, Wisconsin

Excavator manufacturing associates located in: CANADA • ENGLAND • SPAIN • JAPAN

NEW! "Variable Mining Height"

chain and machine, thereby reducing wear on both chain and machine.



FIRE RESISTANT RAY-MAN CONVEYOR BELT HANDLES HEAVIER LOADS LONGER

It's the *last* one-third of conveyor belt life that determines its *true* and *final* cost to you. That's why every component of Ray-Man Conveyor Belt is precision proportioned to assure better belt balance where it pays off most for you — in longer belt service life on your installation!

Ray-Man Conveyor Belt trains *naturally*, troughs *easily* . . . handles fuller, heavier loads even where small pulleys are required in low-head room operations. Special cushioned strength members and double compensation to relieve outer ply stress provide impact resistance *plus* exceptional flexibility.

Ray-Man requires no breaker strip . . . holds fasteners and resists gouging, tearing and ripping better than other constructions. R/M's exclusive "XDC" Cover adds additional protection against wear, tear, cuts and abrasion never before possible. Ray-Man Conveyor Belt is mildew-proof, moisture-resistant and available now in special construction with Bureau of Mines' acceptance designation: "Fire Resistant, U.S.B.M. No. 28-10."

You can't use a *safer*, better handling — *longer lasting* belt for underground mining operations. Let an R/M representative show you how these features add up to "More Use per Dollar" when you specify Ray-Man Conveyor Belt or other feature constructions . . . extra-cushioned Homocord, R/M Tension-Master for extra long slopes and high tensions. Write today for Bulletins.

MORE POWER IN LESS DRIVE SPACE

R/M
***Poly-V*®**
DRIVE



Patented new belt drive concept for heavy duty application. Eliminates V-belt matching problems. Delivers up to 50% *more* power in the same space as regular V-belts — or *equal* power in *less* space! Write for Poly-V® Drive Bulletin #6638.

**Poly-V is a registered Raybestos-Manhattan trademark.*

RM 810

BELTS • HOSE • ROLL COVERINGS • TANK LININGS • INDUSTRIAL RUBBER SPECIALTIES

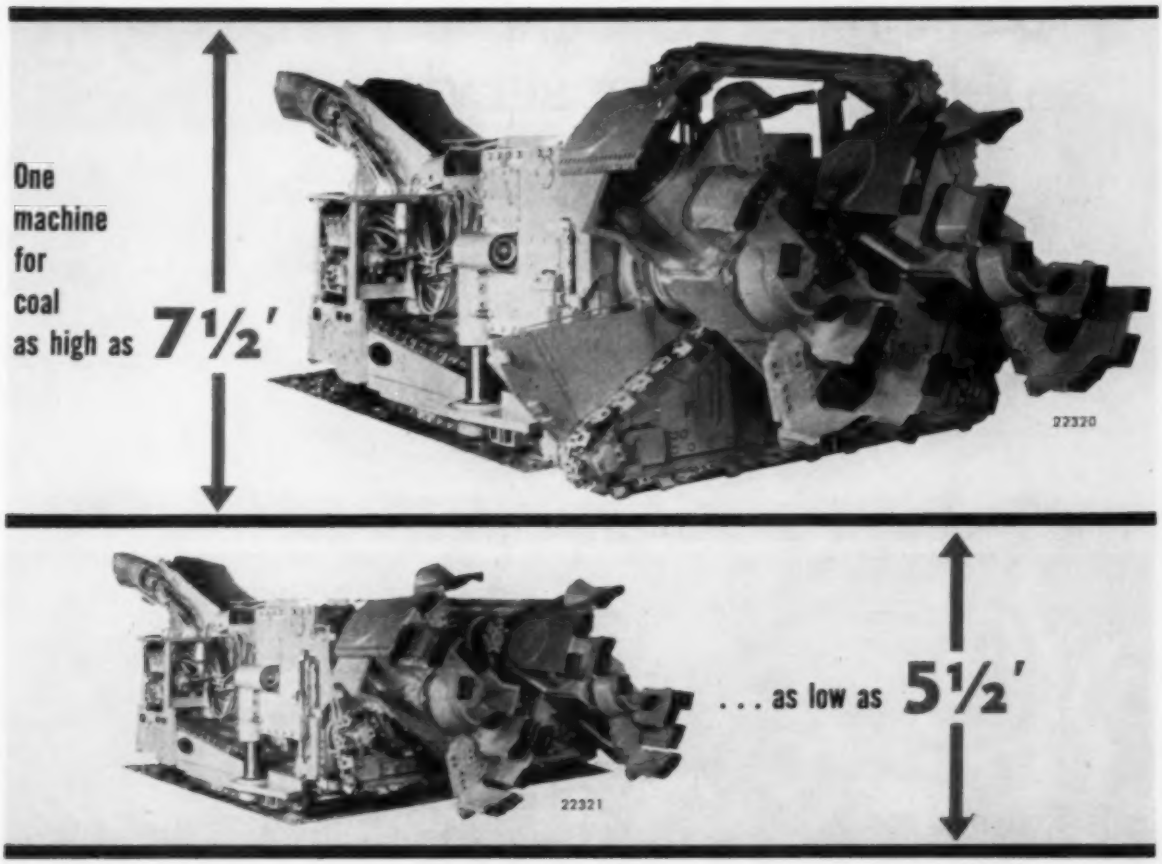
MANHATTAN RUBBER DIVISION — PASSAIC, NEW JERSEY

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Other R/M products: Abrasive and Diamond Wheels • Brake Blocks and Linings • Clutch Facings • Asbestos Textiles • Mechanical Packings • Engineered Plastics • Sintered Metal Products • Industrial Adhesives • Laundry Pads and Covers • Bowling Balls

NEW! "Variable Mining Height" Continuous Borer

GOODMAN TYPE 425



Here's the *newest, most versatile and powerful* continuous mining machine on the market today for profit-boosting tonnages and cost cutting performance.

Now, one machine can be utilized for full-face mining at any height from 7½' down to 5½' . . . and the mining height can be varied as the machine advances.

The 425 is an exceptionally rugged machine that combines capacity with a flexibility of movement that suits it to all phases of development, room, and pillar recovery work. All movements are powered by a single 250 h.p. Goodman AC or DC motor.

Call in your Goodman Sales Engineer for the full story.

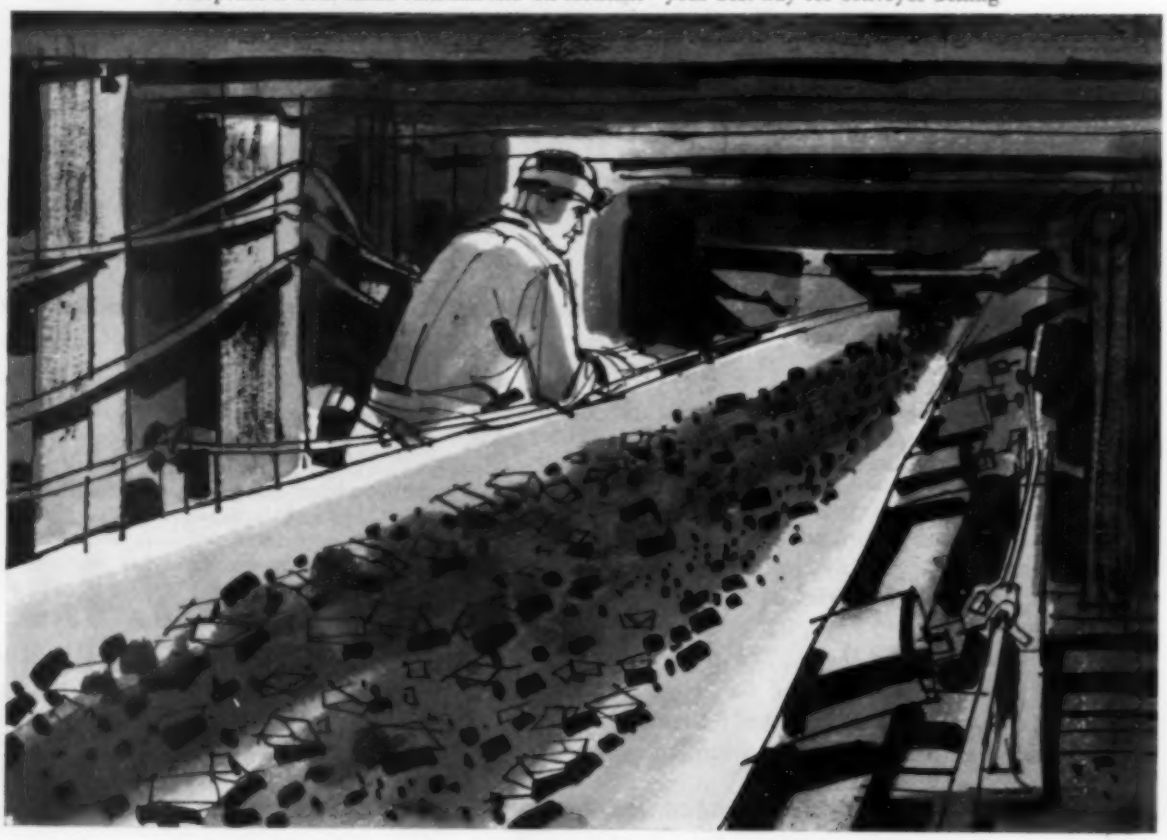
GOODMAN
MANUFACTURING COMPANY
Halsted Street and 48th Place, Chicago 9, Illinois

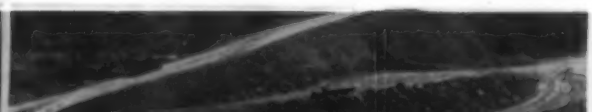
CUTTING MACHINES • CONVEYORS • LOADERS
SHUTTLE CARS • LOCOMOTIVES • CONTINUOUS MINERS

"For continued leadership in machines for continuous mining—look to Goodman"

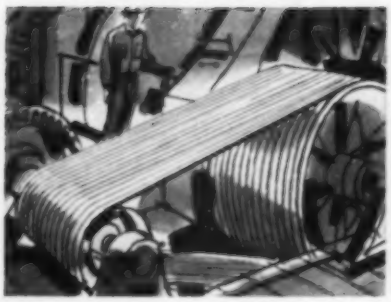
Why rubber products made with Du Pont neoprene offer economy, safety and long service

Neoprene is both flame resistant *and* oil resistant—your best buy for conveyor belting



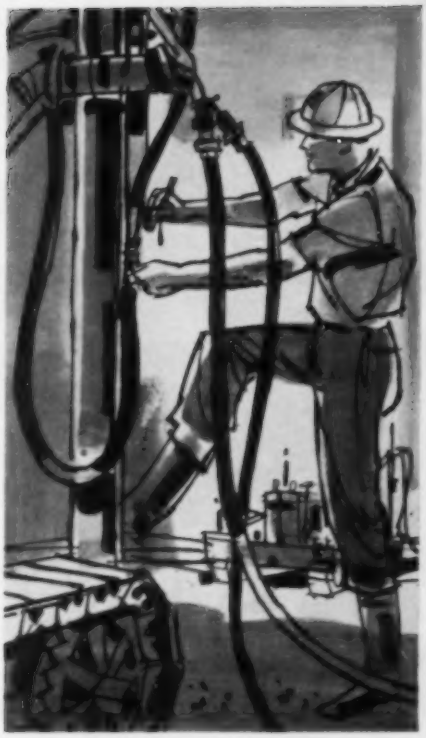


Tire makers stress



Ability to withstand heat, oil and high-speed flexing are three reasons why neoprene is used in quality V-belts.

Neoprene air hose tube resists oil mist, will not flake off and jam tools. Neoprene cover doesn't fail in sunlight, withstands abrasion and rough handling.



Conveyor belting made with Du Pont neoprene has proved its value in many mines. Its flame resistance is an important safety factor, and neoprene's durability is showing up in the records of many operators who watch expenses.

That's because neoprene belting is flame resistant *and* oil resistant. Lubricants can drip on it without causing softening that results in exposure of the fabric to water, mildew and mechanical damage. One neoprene belt has carried *oiled* coal for 17 years. On the surface, neoprene's resistance to sunlight and weather is an important feature.

Neoprene is also used in air hose, V-belts, trailing cable, packings, brattice cloth and ventilating tubing. Your rubber goods distributor can show you how neoprene offers the most for your money.

For more information on neoprene and HYPALON®, a new Du Pont synthetic rubber, read *Du Pont Elastomers in Industry*. Write to Elastomer Chemicals Department CO-10, E. I. du Pont de Nemours & Co. (Inc.), Wilmington 98, Delaware.

Du Pont synthetic rubbers do more things better...
NEOPRENE • HYPALON®

DU PONT

Better Things for Better Living... *through Chemistry*



Tire makers stress haul-road maintenance in recent booklets

"The better the haul road, the longer tires and units will operate without interruption, and the less the cost. Tire cost can be greatly reduced by keeping haul roads free from large stone, stumps, chuck holes, ledges, or any sharp or foreign substances that may injure or cut tires.

"Systematic, constant maintenance using motor graders or bulldozers keeps roads smooth and free from rocks. The cost will be more than repaid by the saving in tire and vehicle maintenance and by fewer service delays."

from "Off-the-Highway Tires"
(published by a leading tire firm)

• • • • •

"...the surface over which the vehicle operates is a very important factor in the total life of the tires — as well as the vehicle. Imbedded or loose rocks will decrease the speed of operation while vehicle breakdowns and maintenance costs go up. Improper drainage will cause mud and chuck holes that result in tire spinning, fast wear, cuts and fuel losses.

"These are but a few of the causes and effects of poor maintenance of haulage surfaces. Its importance cannot be overemphasized. While the cost of equipment and labor is high for maintaining the best possible hauling surface, the cost of delays, tires, and equipment repairs is many times larger."

from "How to Get More Life from Tires on Off-Road Equipment"
(published by another tire-maker)



Here's how...

Good haul-road maintenance can be low-priced, because you can do it with the same fast, versatile machine that does *other* jobs for you. Just replace one of your present rigs with a unit that will do that machine's work and *maintain roads, too.* Here are three such machines:

NEW FLEXIBILITY

Why better haul roads save you money

You can solve *some* hauling problems with new equipment . . . bigger, faster, more rugged units, like LeTourneau-Westinghouse Rear-Dumps. Another way to step-up your pit-to-plant tonnage and reduce per-ton costs is by keeping your haul roads in better shape. Here's how you benefit:

Faster speed . . . more trips per shift

First of all, on better roads, your haulers can travel 5 to 10 mph faster — therefore make more trips per shift. Operators will find they can haul in a higher gear, for greater fuel economy, less engine wear. You'll be able to inflate your tires by a few more pounds . . . for cooler running, less flexing, less wear. With higher inflation pressures, the load-bearing capacity of your tires increases, too. A 5-lb increase in pressure on some tires adds a ton-per-tire of load capacity!

On well-maintained roads you'll reduce spillage. One bad chuck hole can shake off a couple of hundred pounds of loose material from each high-heaped hauler. Multiply that by the number of trips you're running per day, and your loss proves costly. What's more, the rough, bouncy travel caused by poor roads makes their surfaces worse with each passing hauler.

Fewer repairs . . . longer unit life

Good roads help you save on repairs. Tires are less subject to cuts, cracks and abrasion. Your springs last longer. And when you eliminate deep ruts, pockets, chuck holes, and snags on your roads, you reduce jarring that can shake loose nuts, bolts, screws, and mountings . . . that can twist your hauler frame, and throw your whole rig out of alignment.

Stop mud, ice before it starts

With a planned and continuing program of road maintenance, you can provide proper drainage to keep water off and away from your roads. This licks most mud and ice problems before they start. Result: you'll have less weather delays . . . can work longer seasons, keep producing profitably more hours and days per year.

Finally, better haul roads add a big safety factor to your operation. Many a truck has been tipped or damaged by a deep hole or slippery shoulder. Bumps and jars slow down operations, diminish efficiency, cause undue operator fatigue — long before the shift is ended.



D Tournapull® is a 138 hp, 29 mph 2-wheel prime-mover on rubber tires, available with either a 9-yd scraper or an 11-ton Rear-Dump. Either way it's a fast, rugged hauler. Scraper makes an excellent one-man stripping crew . . . self-loads, hauls, spreads accurately, or grades surfaces . . . can also be push-loaded for maximum production at low-cost. Add a dozer blade to prime-mover and you've got a handy road-maintenance unit. It's ready to leave its hauling duties any time . . . to blade off your roads, spread aggregate or topsoil, do ditching or backsloping, leveling, backfilling, shoulder maintenance, or general grading.



Tournatractor® is a 210 hp rubber-tired tractor that goes *anywhere*, at 17 mph. This heavy-duty workhorse matches or exceeds crawlers in "push-power," except at rarely-used speeds under 2 mph. Because Tournatractor *speeds* around your pit or plant area twice as fast as most crawlers (a mile is less than 4 minutes away) this instant-shift, torque-converter unit can blade off roads several times a day . . . still handle "routine" tractor jobs. In many pits, one Tournatractor has replaced 2 or more crawler-type tractors . . . has increased production, yet proved it costs *less* to own and operate than a crawler with similar horsepower.



Adams* motor graders are available in six sizes, from 60 through 190 hp. They lead in better performance features in heavy-duty graders. Adams units have higher working speeds, higher travel speeds (to 26 mph). With "work power" attachments, this LeTourneau-Westinghouse product also handles many jobs. With *scarifier* you open-up clay, rock-filled soil, old roadways . . . with *push-plate* you pushload scrapers, start stubborn equipment. *Dozer* blade permits odd-lot casting, backfilling. *Jebco Elegrader* strips topsoil, loads dirt, stockpiles material, cleans ditches, builds up roads. Snow equipment handles snow removal.

See or write us for further details on the why and how of road maintenance at your pit or quarry. We'll help you plan an effective, efficient, low-cost program.

*Trademark DPCTG-1644-MQ-2

LeTOURNEAU-WESTINGHOUSE COMPANY, PEORIA, ILLINOIS

A Subsidiary of Westinghouse Air Brake Company

Where quality is a habit

NEW FLEXIBILITY...

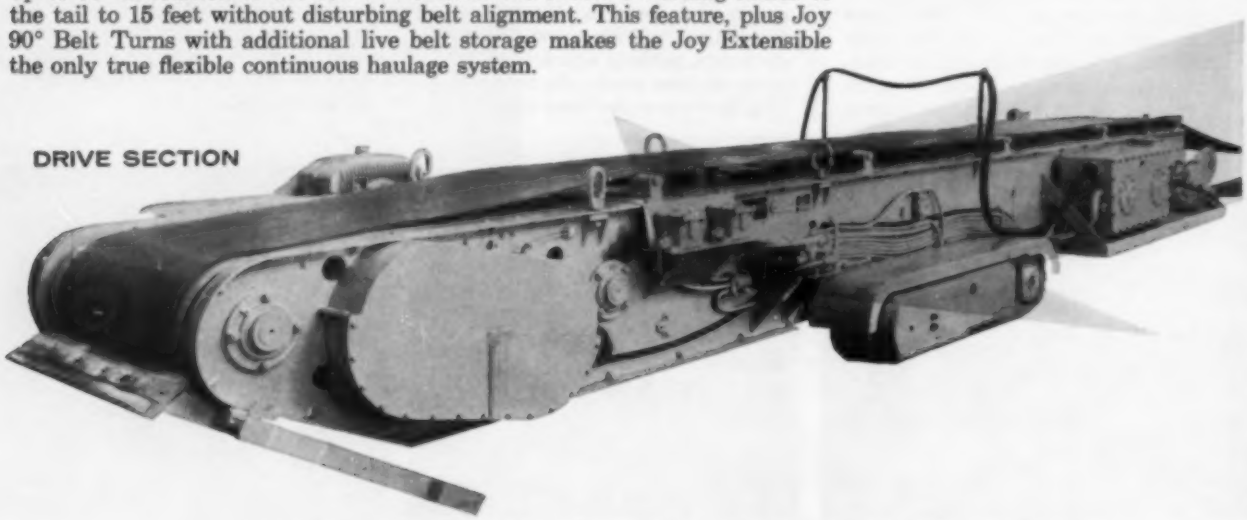
THE NEW JOY 36" EXTENSIBLE

CAPACITY UP TO 11 TONS/MINUTE

This new 36" Extensible Belt was designed to keep pace with Joy's high capacity Twin Borer Miner. Hauling its load at 500 feet per minute, the Joy XB-36 carries higher tonnage than any belt of its kind. The belt can be extended while operating—an exclusive feature with all Joy extensibles. This means that even the highest capacity continuous-type miners can now be used to best advantage—and never get ahead of the haulage system.

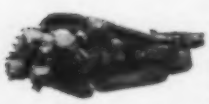
Higher capacity is combined with new flexibility. A new tail section swivels up to 90° in relation to the belt . . . extends the effective working radius of the tail to 15 feet without disturbing belt alignment. This feature, plus Joy 90° Belt Turns with additional live belt storage makes the Joy Extensible the only true flexible continuous haulage system.

DRIVE SECTION



TEAM-MATE TO THE JOY TWIN BORER

here's how the team works to provide continuous mining and continuous haulage:



TWIN BORER . . . Full-face continuous miner of 8-tons-a-minute capacity with peaks up to 10 tpm. Mines coal from the face and loads it onto . . .



BRIDGE CONVEYOR . . . Connects Miner and Extensible Belt regardless of their position. One end supported by ball joint on tail of Miner which permits a 65° swing to either side. Other end rides on rails mounted on . . .



TAIL SECTION . . . Crawler mounted; advances with the Miner to extend the belt. Exclusive swiveling tail pulley permits the tail section to turn 90° off center, while belt remains in line with . . .



INTERMEDIATE SECTION . . . Formed by adding Limberoller idlers under the belt as the Miner and tail section advance. Simple "bed frame" sections hook together without bolts. Famous Limberoller idlers give perfect troughing, training and cannot harm belt.

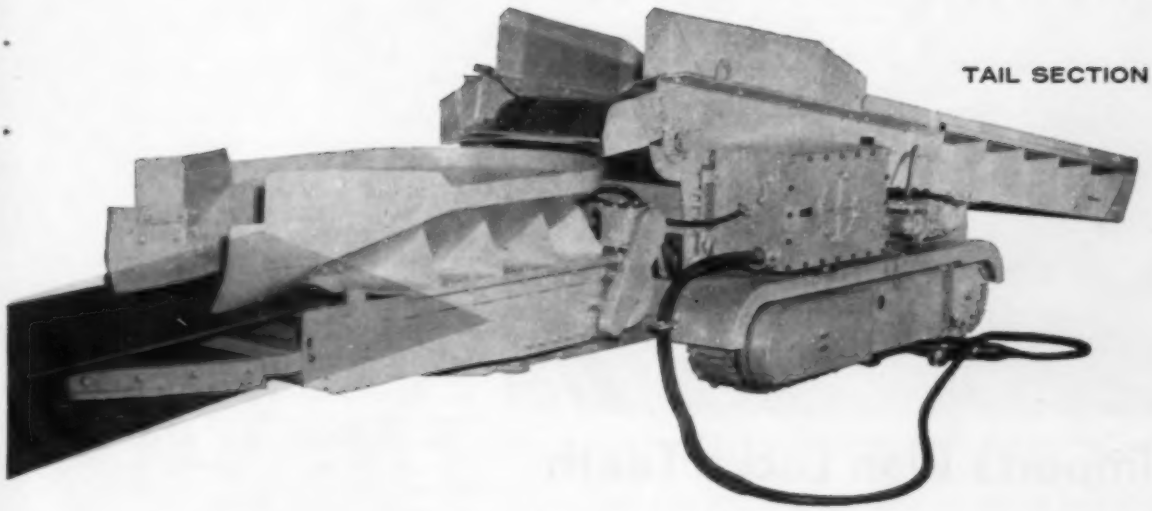


DRIVE SECTION . . . Stores the belt —controls tension and drives the conveyor. Completely self contained —requires no additional devices to store or add belting. Stores up to 200 feet of belt for 100 foot advance.

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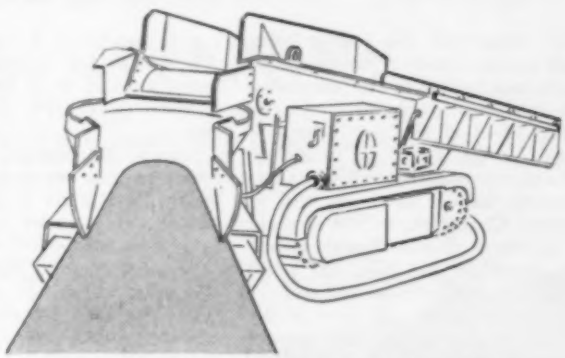
HIGHER TONNAGE

BELT CONVEYOR



TAIL PULLEY SWIVELS 90°

The secret of the XB-36's new flexibility lies in Joy's exclusive improved tail section. Regardless of the position of the tail section, the tail pulley remains square with the belt. The tail pulley is mounted in an independently swiveling hopper with long sideboards. Vertical rollers in the framework guide the belt and keep it in perfect alignment, even though the tail section is turned as much as 90° off center. This system protects the belt from damage and permits the tail section to advance while the belt is running.



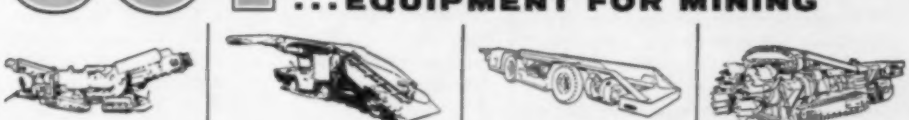
Joy Ex-Belts are successfully being used for highwall recovery, for driving entries, for driving rooms 45° and 60° from panel entries, or 90° using the block system. Consult a Joy engineer about using a Joy Extensible Belt in your operations. **Joy Manufacturing Company, Oliver Building, Pittsburgh 22, Pa.** In Canada: Joy Manufacturing Company (Canada) Limited, Galt, Ontario.

Write for Free Bulletin 255-1

AC

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News Roundup



Oil Imports Plan Lacks Teeth

New program makes very little change in total imports allowable. Coal's needs ignored.

The struggle of the coal industry against cheaper-than-coal foreign oil apparently was ignored in the formulation of the new imports program.

Initial effect of the new program—planned for Jan. 1—will be to slightly reduce import totals, although not in any appreciable amount as far as coal is concerned. Current import limit of crude and unfinished oil is at 870,000 barrels daily. Under the new plan, Jan. 1 will see this cut to 826,300 barrels daily.

The big change in the plan is the basis for arriving at the total imports allowable, which will be limited to 10.1% of Bureau of Mines estimate for total demand—domestic and export. To arrive at this level, the import allocation will be based on a percentage relationship to total refinery runs for the previous year.

Starting Jan. 1, the larger importers will be allowed to import a maximum of 37½% of their total refinery capacity. Smaller importers—those under 6% of refinery capacity—will have their imports allowable raised to 6%.

After 6 mo, mid-1959, the smaller refiners will have their imports allowable boosted to 9% of their refinery runs, and the larger refiners will be reduced progressively. The largest refiners will be limited to 16% of refining capacity at this time. By Jan. 1, 1960, they will be further reduced to an import allocation of about 12 to 13% of their refinery runs.

Imports Administrator Matthew V. Carson said the use of refinery capacity for the first 6 mo is because of the present wide variation in runs of individual companies.

Beginning Jan. 1, 1960, the imports allocations will be based on the percentage of total refinery runs for the 12 mo ending Sept. 30, 1959. From there on, every 6 mo, new quotas will be computed, based on refinery runs for the 12 mo ended 3 mo earlier, with the total imports not to exceed 10.1% of domestic and export demand total.

The new program applies only to areas east of the Rockies. The West Coast is expected to come under the plan at a later date.

Another change in the plan is that to be an importer, the company also must be a refiner.

New refiners, naturally, will be allowed to come into the plan, on the same basis as the others. Provisions also are made for increased import allocations when the refiner's capacity increases—only to the level to maintain their share of the program.

No restriction as to usage is placed on the oil once it is in this country. But the allocations themselves will not be transferable or assignable.

The new plan still leaves the door wide open for importers of residual and fuel oil. These two—heaviest competitors of coal—are classified as finished products, thus not regulated by the plan.

Loud protests against the plan are coming from a number of the larger refiners. This will undoubtedly bring some modification to the plan, which will be no surprise since Carson asked for industry opinion and agreed to any "necessary revisions" in the plan itself.

But the protests are so strong, some observers feel the companies could likely push the government into imposing mandatory controls on oil imports. How soon, or the details of such a move, are open to speculation.

Mandatory controls, however, more than likely would not change the total amount of foreign oil imports very much.

This leaves two channels of attack from the coal industry, neither of which are very encouraging.

For one, a heavier drive can be made toward raising duties and taxes on imported residual and fuel oil. But this will run headlong into the all-powerful East Coast group of fuel oil importers and suppliers, who are not without legislative friends to help them block any such move.

In addition there is the widely-popular idea and practice of keeping imports shackles to a minimum to enhance U.S. foreign policy. Also, the cheap, foreign fuel oil and residual can withstand several tax and duty hikes and still sell for less than coal. This is true of all residual and fuel oil except that

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News Roundup (Continued)



Are you getting maximum life from your wire rope?

You can lengthen the service life — and lower the yearly cost — of your wire ropes by using the *correct* Whyte Strand Wire Rope for each piece of equipment.

What do we mean by correct? Well — all wire rope isn't alike. The demands of dragline service are different from those on scrapers or shovels. But whatever the requirements — no matter how tough the job — there's a Whyte Strand Rope specially designed to withstand the particular abuses of *each* kind of service. What's more, we'll be glad to recommend which of Macwhyte's thousand-and-one ropes is the *best* for *your* kind of job.

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made from crude produced here in the U.S.

The other alternative is to concentrate even more effort on cutting coal costs to make it more competitive. But this idea runs up against the perpetual headaches of rising costs over which the coal producer has no control, of which labor and equipment dominate.

The only bright spot is the estimates for future fuel needs. These point toward a more than doubling requirement for all fuels, including coal.

Minimum Wage Hike

A boost of 50 cents per hour in the minimum wage rate paid to miners for government-contracted coal goes into effect Oct. 20.

Under the Walsh-Healey Public Contracts Act, an operator must comply with the minimum wage law to be able to sell coal to any government agency. The new raise will have little effect on unionized mines since their hourly wage is already above the government minimum. But non-union mines, many of which supply coal to the government, will definitely feel the new wage rate. Non-union coal mines amount to about 10 to 15%.

In the case of Districts 1,2,3,4,6,7,8, and 10, the major coal producing areas, the raise jumps the minimum from $2.245 an hour to $2.745.

Other districts and their new minimum hourly wages are:

District 9,14, and 15, $2.59;
District 11, $2.78;
District 12, $1.40;
District 13, $2.515;
District 16,17, and 18, $2.796;
District 19 and 20, $2.82;
District 21, $2.226;
District 22, $2.846;
District 3, $2.735.

Swinging Door Dept.

More than a dozen men dug furiously at the caved-in entrance of an abandoned coal mine near Swoyerville, Pa. A woman stood nearby spurring them on with a detailed report of a man who had entered the mine in search of coal just before the roof fell in.

Twenty minutes later word came to the rescuers that the "victim" was enjoying a beer at one of the local pubs. He was in the mine when the roof fell in, but wandered around, found another exit and walked out—unseen by the watchful woman.

Pension Battle Grows Hotter

Pressure is mounting among anthracite coal miners to merge the anthracite and bituminous Health and Welfare Funds in a push for "equal rights" in the United Mine Workers of America union.

The anthracite men have picked a committee to meet with John L. Lewis, UMWA president, to present their proposal in hopes of reaching these goals:

- A monthly pension of $100.
- Health and accident coverage for workers and pensioners.
- Hospitalization and disability payments for miners and their families.
- "Other benefits" enjoyed only by those in the bituminous industry.

Another complaint voiced by the anthracite men is that many coal operators are not paying the union-required royalty of 50 cents per ton. The royalty makes up the Welfare Fund.

Pensions, a prime subject among anthracite workers (average age is 46.8), get credit for touching off the Welfare Fund merger and pension drive. The anthracite miner's pension started out as $100 monthly but was cut to $50. A recent cut down to $30 apparently was the straw that broke the camel's back. The pension is presently back to $50, but anthracite men say the restoration was only a move by Fund trustees to head off their drive toward more money and benefits. The raise from $30 monthly to $50 for September only increased the anthracite men's determination to fight for $100.

The first meeting, in Swoyerville, Pa., Aug. 30, drew approximately 350 men, who started the meeting with threats of "marching on Washington to see Lewis." It was quickly evident, however, this was not just an angry group bent on divorce from the union. In fact, leaders at the meeting stressed there was no intention of breaking with the union, but "merely to regain suitable benefits."

The Swoyerville meeting was followed by others at Mount Carmel and Olyphant with each meeting drawing more than 1,000 miners from the neighboring areas. The move so far has been unanimously endorsed by almost all of the anthracite locals in Districts 7 and 9. District 1 was reported as offering only lukewarm response although several locals from there participated in the meetings.

However, meetings are still being held to promote and assure backing for the drive. The committee going to Washington to meet with Lewis wants each district president to go along.

Welfare Fund Up

The United Mine Workers of America Welfare and Retirement Fund shows a half-million dollar increase in its unexpended balance for the year ended June 30, despite a 11% drop in royalty payments brought on by decreased coal production.

The annual report lists the unexpended balance as being $145,832,703.85 compared with $145,321,221.85 this time last year. Royalty payments of 40 cents per ton of bituminous coal produced brought $138,297,694.21 into the Fund during the fiscal year.

Administrative costs are shown at 2.8% with 209,818 beneficiaries of the Fund—miners and their families—sharing in pensions, hospital and medical care and other benefits to a total of $138,501,681.61.

This breaks down to: Pensions, $76,657,464.81; hospital and medical care, $58,135,684.16; funeral expense, widows and survivors, and mine disaster benefits, $3,708,532.64. A total of 64,367 retired miners were on pension at the close of the fiscal year, according to the report.

Flood Control Study

Eighteen months and $75,000 have been set aside for an intensive study aimed at preventing future flood damage to anthracite mines in the Wyoming Valley, Lackawanna and Luzerne counties, Pa.

The State Council of Civil Defense, under the Emergency Flood Control Act of 1957, is giving the money to the Department of Forest and Waters for the study. The investigation will be conducted by the U.S. Bureau of Mines through an agreement with the Department of Forest and Waters and the Pennsylvania Department of Mines and Mineral Industries.

Results of the survey will be used by the U.S. Army Corps of Engineers to determine flood protection measures. If the study proves the need and feasibility of flood control works, the Engineers will then ask Congress for authorization to do the work.

Flood damage to anthracite mines in the Wyoming Valley during 1955-56 amounted to $2,236,671. No state assistance could be given to coal at that time because of lack of authorization and money.

In making the announcement, Governor George M. Leader said "in order to justify the project to Congress, the

News Roundup (Continued)



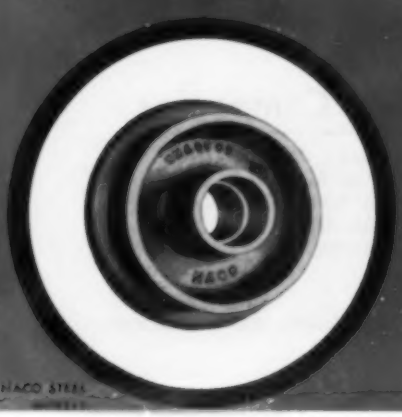
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In 1951 Olga Coal Company bought 300 coal cars equipped with National NC-1 Trucks, National rubber cushioning devices, Willison Automatic Couplers and Naco Steel Wheels.

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ACCIDENT PREVENTION classes, five weeks of them, started up at the Deerfield mine of Pocahontas Fuel Corp. with 238 men enrolled. Sponsored by the Bureau of Mines, the classes are being conducted by Lloyd Fitzgerald, mining engineer from the Bureau's Mount Hope, W. Va. office. The classes, two per week, are held in a tent near the main mine portal either before or at the end of shifts.



HUTCHINSON MINE, Pittsburgh Coal Co. won first place in the Westmoreland County, Pa. first aid contest. Team members and company officials are: left to right, kneeling, F. L. Black, safety director; A. Lesnicky; A. Gedman; and Mike Sapp. Standing; D. Warner, superintendent; J. Podbesek; M. Fraicola, team captain; F. Kovac; S. Halahurich, and L. Cecchett, mine foreman.



GARY NO. 3 TEAM, U.S. Steel Corp., Coal Division took first place in the annual Fayette, Raleigh, and Wyoming counties first aid meet. The winners are: left to right, kneeling, Otis Hall, Max Webb, Russell Burge, and Gordon Walrod. Standing; Otto Brown, National Mine Service; Henry Carter, Mine Safety Appliances Co.; Albert Wagers, captain; Walter Luckhart; Fred Ball; Crawford L. Wilson, director, W. Va. Dept. of Mines; Charles Ferguson, director of safety, International Union of UMWA; and James Leeber Jr., safety engineer, District 29, UMWA.



ROBENA NO. 2 MINE team, U.S. Steel Corp., Coal Division copped first in the Southwestern Pennsylvania Safety Association meet held at Waynesburg. Team members and company officials are: left to right, kneeling, George Rattay; John Chambers, captain; Joseph Simon, first aid instructor; William Lee, and George Yurkremic. Standing; W. E. Cook, assistant general superintendent; J. A. Boyle, chief mine inspector; Andrew Hatalla; Lewis Kopec; William Humbert; Ralph C. Beerbower, general superintendent; and George Wydo, superintendent, Robena No. 2 mine.

Corps requires a detailed study indicating there is a definite need for flood protection works. It is the purpose of this study to provide this information."

The study will cover these areas:

1. Structural conditions of mines underlying areas susceptible to flooding by the Susquehanna River.

2. Condition and effectiveness of barrier pillars in mines vulnerable to flooding, including determination of possible effects on these pillars from surface floods.

3. Compilation of amount and value of the coal reserves and of possible loss of these reserves through flooding.

4. Relative degree of danger to mining areas under lowlands susceptible to surface water flooding.

5. Economic survey of damage to anthracite industry in the Wyoming Valley should these mines be closed by flooding.

6. Defense aspects of the anthracite industry in the Wyoming Valley.

7. Maps and diagrams to illustrate existing conditions and important features of the problem.

Mines, Companies

Work started this month on tunnels to by-pass the fire in the Koehler mine near Raton, N.M. The mine shut down when the fire started June 8.

Joseph Kastler, property manager for

(*Continued on p 59*)



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From its rugged, abrasion and weather-resistant Roeprene® Sheath, right to the heart of its extra-flexible conductors, Roebling SH-D Portable Power Cable was designed to give full-power performance. The extra quality features show you why Roebling SH-D is better in terms of superior service, ease of installation and maintenance. For more facts, write Electrical Wire Division, John A. Roebling's Sons Corporation, Trenton 2, New Jersey.

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Extra—A combination of properties which permits operation with copper temperatures up to 90° C.

People in Coal



Coal Show Chairman

E. P. HUMPHREY has been named national program chairman of the 1959 American Mining Congress Coal Show to be held in Cleveland next May.

To Mr. Humphrey, president of Stonega Coke & Coal Co., with his years of work and interest in the coal industry, such a responsibility is a fitting honor.

He was born in Wilkes-Barre, Pa., in 1893, the son of John M. and Marie Louise Humphrey. Mr. Humphrey was graduated from Lehigh University in 1915 with a degree in mechanical engineering. He worked in the engineering department at Lehigh Valley Coal Co. until 1917, when he joined Hazle Brook Coal Co. (anthracite) as assistant superintendent.

Mr. Humphrey stayed with Hazle Brook 13 yr, winding up as general manager, before he left in 1930 to join another anthracite operation, Lehigh Navigation Coal Co. as superintendent of strip mining, construction, and preparation facilities. Six years later he left anthracite to become a vice-president and a member of the board of directors of Stonega. He was elected to his present position in 1951.

In addition, he is vice-president and director of Westmoreland Coal Co.; Westmoreland, Inc.; Virginia Coal & Iron Co.; General Coal Co.; and Wentz Corp. He is a director of Bituminous Coal Operator's Assn.; Bituminous Coal Research; American Briquet Co.; Interstate Railroad Co.; Central Supply Co. of Virginia; Clear Creek Water Co.; Cumberland Water Co.; and Virginia Wholesale Co., Inc.



J. M. Connor, vice-president of Allegheny Pittsburgh Coal and Windsor Power House Coal companies, subsidiaries of West Penn Power, retired Sept. 1.

Mr. Connor began his 43 yr-career in the mining industry after graduation from Pennsylvania State University. He worked in the coal fields of West Virginia, Kentucky, and Pennsylvania until 1920, when he joined Windsor.

After 7 yr as resident engineer at Windsor's Beech Bottom mine in West Virginia, he moved to the general office at Pittsburgh as mining engineer. His next step up was general superintendent of mining operations for West Penn in 1934. He was elected to his most recent position in 1948.

Mr. Connor is a director of Western Pennsylvania Coal Operator's Assn. He is a past president of Coal Mining Institute of America and Pittsburgh Coal Mining Institute.

Earl C. Payne, consulting engineer on Consolidation Coal Co.'s general staff, retired Aug 31 after 31 yr with the company.

After graduation from the University of Michigan in 1919, Mr. Payne spent several years in various engineering positions before joining Consolidation in 1927 as Western Manager of engineering service.

Since 1935 he has been consulting engineer, concentrating on fuel, equipment and coal application problems of the utilities and railroads.

He is known throughout the industry for his research and development work in coal.

E. W. Yorke Jr. has been elected a vice-president of Pittston Clinchfield Coal Sales Corp. with headquarters in New York City. **W. A. Schmitt,** assistant district sales manager at Cleveland, replaces Mr. Yorke as Cleveland district sales manager.

Truman M. Dodson has been elected executive vice-president of Lehigh-Boone Bituminous Corp. in addition to the board of directors of the Boone County Coal Corp. at a recent director's meeting of the two firms.

R. F. Wesner, Boone County Coal operations vice-president, was elected to the board of Lehigh-Boone, as was **W. B. Joachim Jr.,** secretary of the parent Lehigh Coal & Navigation Co.



Robert E. Lee Hall, general counsel of the National Coal Assn. is the new chairman of the Mineral and Natural Resources Law section of the American Bar Assn.

Mr. Hall formerly was vice-chairman of the section. He was elected chairman



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He pinpoints faults with an O-B Locator!

When a fault hits his trailing cable, he wastes no time. He pulls the plug and goes for his O-B Cable Fault Locator.

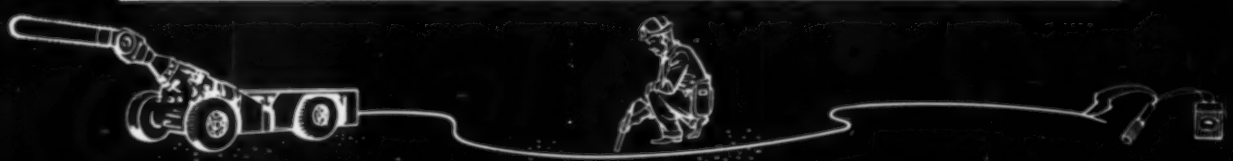
It takes him only a minute to clip two leads to the power conductors, two to the small six-volt battery—and he's ready for testing. Testing is simple too—a slow walk back along the cable with earphones and slim transistor receiver. When he hears a change in signal he's found the short or open and can make repairs.

If you've been wasting too much time tracking down hidden faults, you could use an O-B Locator, too. It's pocket size, weighs only four pounds, costs less than any cable you'll use it on. Send for Booklet K-423 for complete information.

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For top holding power—in any top, more bolting crews use O-B Shells and Plugs than any other type of expansion unit. You can order them, as they do, from the catalog numbers shown below.



O-B Standard
21889—for ¾-inch bolts
21890—for ⅞-inch bolts



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22378—for ¾-inch bolts
22463—for ⅞-inch bolts

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4834-M



People in Coal *(Continued)*

at the recent ABA convention in Los Angeles. In addition, he is general counsel of the Bituminous Coal Institute and secretary of Fuels Research Council, Inc.

In his new position, Mr. Hall heads about 2,000 attorneys interested in mineral resources, including coal, oil, gas, water, and atomic energy.

He is a graduate of George Washington University Law School, and has been an instructor in labor law and labor relations at the University of Denver and Southeastern University, Washington. He also was a member of the War Labor Board, the Wage Stabilization Board, and the National Sugar Panel.

Robert D. Karns has been appointed chemical engineer for Bituminous Coal Research, Inc., Pittsburgh.

Mr. Karns, former process improvement engineer with Pittsburgh Coke & Chemical Co., has been assigned to one of the new projects at BCR—control of sulfur dioxide and other contaminants in flue gas.

His specific job will be to evaluate the existing processes concerning control or possible removal of contaminants.



D. H. Davis has been appointed assistant to the vice-president of operations of Consolidation Coal Co., Pittsburgh.

For the past 6 yr, he was operating vice-president of Mathies Coal Co. In his new position, he will assist D. L. McElroy, Consolidation operations vice-president.

Mr. Davis began his coal career in 1934 when he was graduated from Ohio State University. He then started with Pittsburgh Coal Co. as a coal sampler and assistant chemist. In 1943 he was promoted to product control manager and in 1950 was appointed a division superintendent. He was made a vice-president of Mathies when the company was formed in 1952.

Other recent changes among Consolid-

HUBER-WARCO
motor graders



keeps haul roads clear for payloads

Earth rolls off the moldboard as the Huber-Warco MOTOR GRADER quickly and efficiently performs its grading assignment. Huber-Warco MOTOR GRADERS with torque converter, tail-shaft governor and power-shift transmission make faster passes with smoother cuts . . . gives more profitable grader operation. Once the operator sets the desired speed it is maintained by the tail-shaft governor, regardless of load conditions. Operators also like the easy maneuverability and the fact that there is NO CLUTCH in the torque converter models provides a new ease of operation. An exclusive feature of Huber-Warco MOTOR GRADERS is the completely cab-controlled hydraulic blade movement for bank sloping. In less than a minute, and without ever leaving the cab, the operator can move the blade from a 90° bank sloping position on one side to 90° on the other. There are NO manual adjustments to be made. Huber-Warco torque converter and standard transmission MOTOR GRADERS range from 75 to 195 h.p. See your Huber-Warco distributor for complete details.

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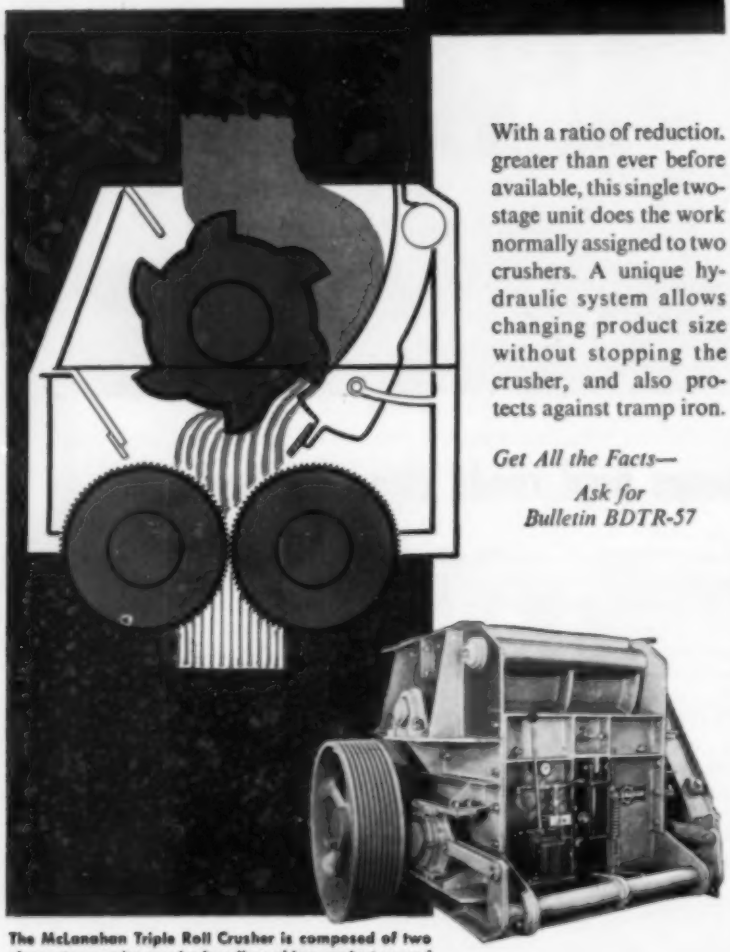
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Bulletin BDTR-57

The McLanahan Triple Roll Crusher is composed of two elements—a primary single roll crushing against curved crushing plate; and double roll secondary performing the final reduction.

McLANAHAN
SINCE 1835

TRIPLE ROLL CRUSHER

People in Coal *(Continued)*

ation officials are: **J. S. Whittaker,** Pittsburgh Coal Co. operations vice-president, assumes responsibility for operations at Harmar Coal Co. and Mathies Coal Co.; **John L. Rozance,** former assistant general superintendent, promoted to general superintendent, Pittsburgh Coal Co. Div.; **Robert D. Lauder,** former Mathies mine superintendent, promoted to general superintendent of Mathies Coal Co.; **M. F. Florjancic,** former Mathies mine underground superintendent, promoted to succeed Lauder; and **William Kebblish** promoted to succeed Florjancic.

John H. East Jr., regional director of the Bureau of Mines' 8-state Region III, has been voted the Department of the Interior's Distinguished Service Award and Gold Medal.

The honor, highest in the department, was given to Mr. East in recognition of his more than 20 years of achievement with the Bureau in mining engineering, safety and health work and executive administration.

Mr. East, a graduate of the Colorado School of Mines, has been stationed in Denver since 1948. He was there first in charge of health and safety. He became regional director in 1949.

George A. Stachura has been named assistant to the vice-president of the Old Ben Coal Corp.

He will be in charge of production in Southern Illinois and Kentucky. Mr. Stachura moves up from superintendent of Old Ben Mine No. 9 near West Frankfort, Ill. William Bailey replaces him.

Obituaries

D. H. McGeorge, president of Cherry Hill Coal Corp. died in Cleveland, Sept. 4. He was 49 years old.

Mr. McGeorge entered the coal industry with the J. P. Burton Coal Co. in 1924. Later he was associated in executive capacities with the North American Coal Co., the Valley Camp Coal Co., and the C. L. Amos Coal Co.

He pioneered the promotion and sale of briquettes and packaged fuel as president of Carton Fuel Corp. and Coal Cubes, Inc., in 1932-33.

Mr. McGeorge incorporated Cherry Hill in 1954. In 1956 he acquired the subsidiaries Cherry Hill Coal Co., George's Creek Coal & Land Co., and Gay Coal & Coke Co.

Finlay McCallum, Colorado deputy coal mine inspector, died in Denver on Sept. 3.

Mr. McCallum was in an automobile accident Aug. 18 and suffered serious injuries but was thought to be recovering.



Accident! But Anaconda SH-D Shovel Cable kept on working in this open-pit mine. Good proof of Anaconda Cable's ability to take it.

CAVE-IN! But this unposed photo shows Anaconda Shovel Cable still working!

Above you see part of an actual cave-in. The Man from Anaconda was Johnny-on-the-spot with a camera, and the picture shows part of what he saw. The complete cave-in was much more extensive.

We use this photo to show how well Anaconda Shovel Cable stands up under abuse. Jagged rocks, sheer drops over cliffs, water-filled ditches—the Anaconda cable is built to endure all these hazards.

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Anaconda Shovel Cable has a strong, extra-tough—yet highly flexible—neoprene jacket. It resists abrasion, mechanical abuse, flame and water. Its long-lasting Anaconda Butyl Insulation has high dielectric strength, and outstanding resistance to ozone, heat and moisture.

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Coal Abroad

German Imports Cut

West Germany has put a stop to any new contracts for coal imports from the U.S.

The halt, based on article 19 of the GATT (General Agreement on Tariffs and Trades), became effective Sept. 4 and will continue "until further notice."

Economics Minister Ludwig Erhard said existing contracts would be honored, although they would be re-examined to make sure they were genuine. He estimated that coal imports from America this year would amount to about 12-million tons, compared with 16-million tons last year. About 40-million tons are still on contract for delivery from the U.S. within the next three years.

The clamp on coal imports came in response to urgent appeals from German coal owners, who have stockpiles of more than nine million tons of coal and coke. The coal miners union also has complained about idle shifts, which have resulted in more than one million tons of coal not being dug.

Erhard announced these moves by the coal representatives from the Ruhr, Saar, and Aachen areas to diminish their stockpiles:

1. A rebate of 10% for industrial consumers—particularly iron and steel and the utilities—for consumption of coal in excess of coal and coke purchases during 1957-1958. Private householders and small consumers are not eligible because of "technical difficulties" in bookkeeping.

2. Coal sales organizations will drop their prices in countries outside the steel and coal community to a level with foreign offerings. Also, American coal paid for in dollars will be sold where necessary for soft currencies.

3. The steel industry will be encouraged to use more iron ore instead of scrap, thus increasing its coke consumption. Industry will be encouraged to use generated gas instead of fuel oil.

Cost to German coal miners and sales organizations for rebates at home and price slashing abroad is estimated at about $14-million.

Fuel oil competition in West Germany is steadily mounting. Fuel oil consumption in the West German steel industry has climbed from 295,100 tons in 1955 to 549,400 tons last year. The situation is expected to get more intense with the completion of the major refinery center now under construction in the Lower Rhine area between Cologne and Duisburg.

This winter—
speed
your
colliery
operations



Use Sterling Rock Salt to keep your roads, platforms, walks clear and safe . . . to prevent frozen switches and scales. This powerful melting agent helps remove treacherous snow and ice *fast!* It eliminates costly delays around the mine, saves labor during critical cold-weather periods. Sterling Rock Salt is easy to handle and apply, is harmless to hands and clothing.

Give your customers "free-running" coal, too! Sterling Rock Salt prevents coal from freezing in transit, so it can be unloaded quickly and easily. (It takes only 5 lbs. of Sterling Rock Salt to protect one ton of bituminous; 5-8 lbs. for anthracite.) Customers will gladly pay the small premium for coal treated with Sterling Rock Salt! In bulk carloads or 100-lb. bags, regular or Inhibium-treated to prevent corrosion of metal equipment.

Free folder gives further information on Sterling Rock Salt for mines, collieries. Ask your Sterling representative or write to INTERNATIONAL SALT COMPANY, INC., DEPARTMENT CA-1058, SCRANTON, PA.

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ARGENTINA

France, Russia Back Growth

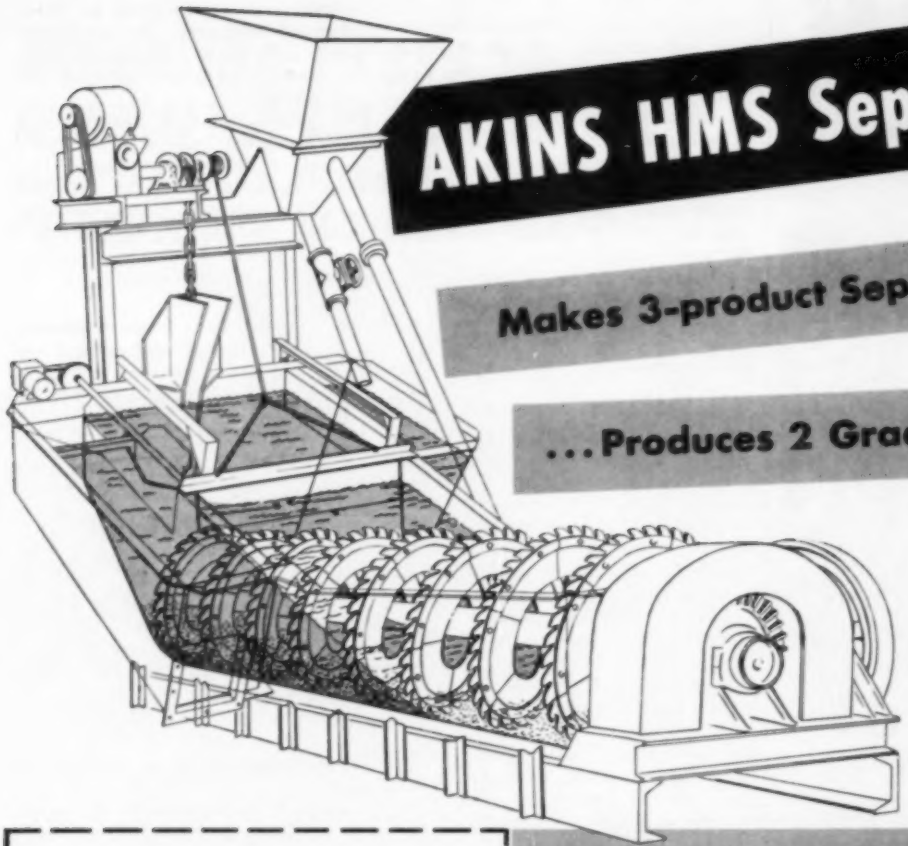
France and Russia are helping Argentina finance development of her Rio Turbio mines as the first step in freeing the country from coal importation. Argentina's current output is 200-000 tons annually. Her goal is to reach 2.9-million tons annually within 3 yr.

From France's CIAVE (Compagnie Industrielle et Agricole de Vente a l'Etranger) of Paris, Argentina gets $42-million credit for development of the Rio Turbio mines, which are estimated to have a gross reserve of 30-million tons. Argentina's government coal agency YCF (Yacimentos Carboniferos Fiscales) also is contracting the French film SOFRE-MINES (Societe Francaise d'Etudes Minieres) to supervise the works at Rio Turbio, and to select necessary materials and equipment.

The contract calls for Argentina to pay the money back in 8 yr with an extension allowance of an additional 8 yr. Annual interest rate is 6%.

Russia entered the picture with a part cash, part credit agreement with YCF

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Coal Abroad (*Continued*)

to the tune of $600,000 for two locomotives and 4,000 tons of rail. Payment for the locomotives is deferred over four years starting from the date of delivery. The rails are C.O.D.

During the past two years, Argentina has sought financial help from the U.S. Export-Import Bank. Various teams of experts sent to Argentina to evaluate the situation failed to produce proof that the project—as envisioned by Argentina—is a safe and risk-free proposition.

RUSSIA

Gas Detection by Sound

Russia claims having a unit that gives advance warning of any sudden discharges of gas in coal mines. Soviet coal men say that, so far, results have been excellent in using their seismo-acoustic unit to warn of gas. According to them, this is the way the unit works:

A "pick-up" head placed in a borehole in the coal face registers even the slightest sound occurring in the coal. The sound waves are then amplified electronically and recorded on a tape in the mine laboratory.

As the recorded sounds exceed a certain pre-set level, men working at the face are warned to leave the danger area. The time between the warning and the gas discharge varies between 7 and 20 hr. Adequate measures can then be taken to evacuate the dangerous gases.

OVERSEAS FLASHES

RUSSIA—Several installations in the Donetz coal basin are reportedly using TV to keep a close check on coal grading, and the operation of the hoisting machinery. Karaganda, one of the more modern mines in the basin, is completing plans for the installation of remote-controlled mining machinery in its underground operations. The same mine also is using X-ray equipment to locate the exact position and extent of new coal deposits.

A shaft-sinking unit, claimed to be ideal for speedy sinking of a vertical shaft, is a 150-ton rig designed as a mobile unit. It has 24,000 individual parts. As high as a normal five-story building, the huge rig rapidly cuts a 22-ft diameter shaft to a maximum depth of 2,500 ft, according to the Russians.

In western Siberia Russia is planning the "world's biggest" underground coal gasification project. Gas work will supply Kuznetsk Iron and Steel works with gas equal in heating power to one million tons of hard coal per year. Source of gas will be coal seam some 20-ft thick at a depth of 1,000 ft. Construction will start "soon."

HUNGARY—Three Year Plan put into operation this year by the Hungarian government is aimed at hiking power generation up to 7.5-billion kwh. The raise, nearly 40% present generation, involves an increase in coal production of slightly more than 25% to 26.5-million tons per day.

AUSTRALIA—Mining unions are busy beginning a campaign for a 35-hour work week, increased wages, four weeks annual leave, long-service leave "without strings", and nationalization of the coal mining industry.

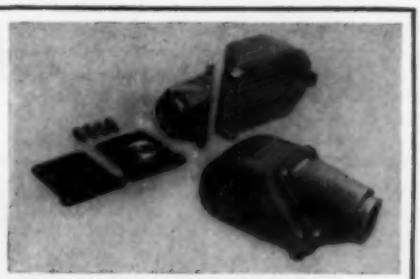
At the same time, Australian coal business is enjoying good health. Exports rose from 545,101 tons last year to 836,336 tons for the year ended June 30. And the coal output per manshift has risen from 2.95 long tons in 1950 to 4.09 long tons in 1958. Australia's Minister for National Development credits the growth not to a program of government ownership, but to "standing alongside and encouraging free enterprise."

CAST ALUMINUM

Guyan

STRAINERS

ECONOMICAL and LONG LASTING

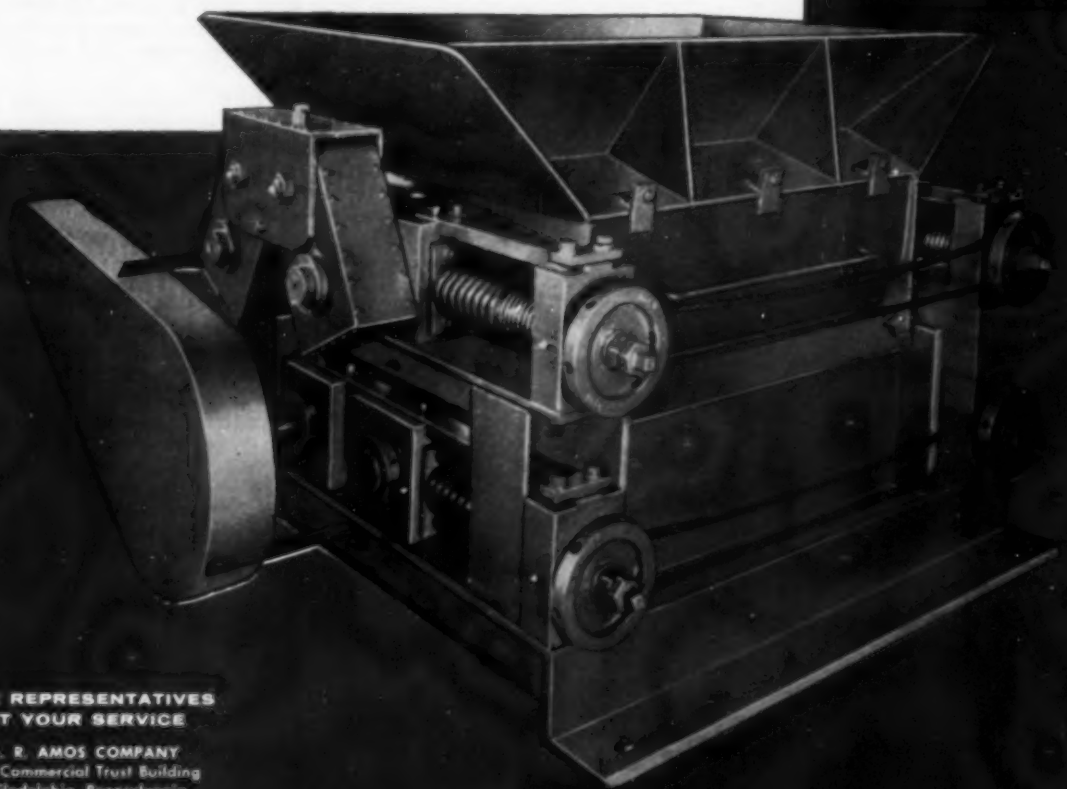


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The expansion provides an increase of 11,000 sq. ft. of floor space. New equipment includes generators, lathes, milling machines, grinders, saws and instruments for increased production and quality control. The new facilities, added to previous extensive production equipment, makes possible the manufacture of a greater number of parts to minute tolerances, with greater speed and precision.

Of particular interest is the expansion of our heat treating department, which provides facilities for degreasing, carburizing, quenching, radivecting, and through-hardening operations. Having our own foundry, we are in a position to cast, machine and heat-treat parts to meet the most exacting requirements of our customers.

The new layout provides enlarged storing and shipping areas, which means greatly increased efficiency in handling of incoming materials, storing of finished parts, filling of orders, and shipping of parts to customers. Steel stock is carried by overhead crane from steel yard to saws. Modern conveyor systems and platform trucks provide fast labor and time saving movement of parts throughout the plant.

Over 500 parts for new types of mining machines have been added to our line, necessitating expansion of our engineering and development departments. Individual parts carried in stock at all times now number about 75,000, including many sizes of gears, sprockets, shafts, bronze castings, and specially designed parts used in mining machines. In addition to inventoried parts, we design and manufacture parts to customers' specifications.

We are proud of the confidence placed in us by our customers and of the progress we have made over the years. We extend a cordial invitation to you to visit our plant at any time and see first hand the production of high quality parts through our unsurpassed craftsmanship, modern production equipment and the use of finest materials.

Sincerely

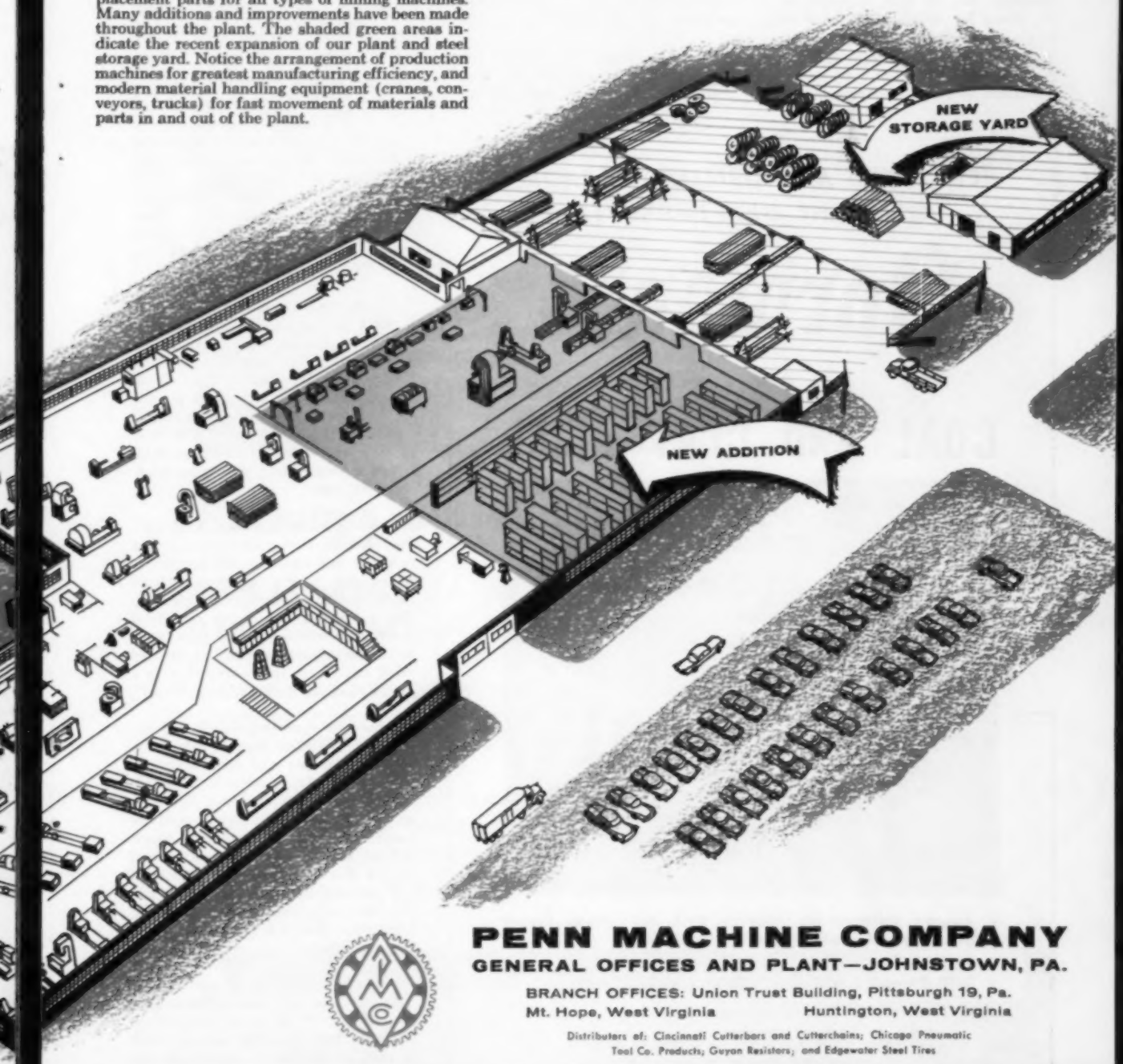
Richard Wright

PRESIDENT



better, in the manufacture of Replacement Parts for has expanded its Johnstown plant and facilities"

The drawing illustrated below shows our complete facilities for producing, storing, and shipping replacement parts for all types of mining machines. Many additions and improvements have been made throughout the plant. The shaded green areas indicate the recent expansion of our plant and steel storage yard. Notice the arrangement of production machines for greatest manufacturing efficiency, and modern material handling equipment (cranes, conveyors, trucks) for fast movement of materials and parts in and out of the plant.



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Big Sandy Electric & Supply Co.
Pikeville, Kentucky

Union Supply Company
Denver 16, Colorado

Current Coal Patents

By Oliver S. North

Mining planer for use in a gallery traversed by a fault, K. Brandi and W. Rosler (assigned to Gewerkschaft Eisenhuette Westfalia, Lunen, Westphalia, Germany), Aug. 19, 1958. Improved mining planer for efficiently removing coal by the long-wall method, especially from narrow seams. The conveyor is formed of individual sections, at least some of which are pivotally connected together for limited motion in a vertical direction. Drive and reversing means are adjustable along the length of the conveyor whereby the conveyor may be extended through a fault with the drive and reversing means positioned on one side of the fault with the planer cutter operated therebetween. No. 2,848,204.

Removal of gallium compounds from the combustion gases of coal, M. Inagaki (assigned to Z. S. S. Kenkyujo, Tokyo, Japan), Aug. 19, 1958. In a process for recovering gallium compounds, gallium-containing coal is burned at a temperature over 700 C and the combustion gases cooled and washed, with an alkaline or acidic aqueous solution. The wash liquor is treated with tannin to co-precipitate gallium-tannin and tannin-iron absorption compounds. The precipitate is dried and burned, and the resulting ash chlorinated. Germanium tetrachloride is distilled off, and the residual solution treated with ether to obtain gallium hydroxide. No. 2,848,398.

Roof-Bolting, A. F. Flygare and A. I. Lundkvist, Sept. 2, 1958. In an improved method of fastening bolts in bores in mine-roof rock, a sleeve-shaped member is inserted in the bore and filled with cement mortar. A bolt is forced into the wet mortar, forcing the latter out through apertures in the sleeve member. When the mortar is hard the bolt and sleeve will be solidly keyed into the rock. No. 2,849,866.

Endless flexible conveyor frame, J. R. Madeira (assigned to Goodman Mfg. Co., Chicago, Ill.), Sept. 2, 1958. Improved endless belt conveyor which is readily and easily assembled, moved and disassembled. When in working position the conveyor is extensible and retractable with a minimum of effort. The load carrying reach is supported independently and separately from the return reach. No. 2,850,146.

Mobile curvable conveyor, J. M. Hill, Sept. 2, 1958. Design for a conveyor that is mobile and curvable, and adapted to follow the mining machine, without tracks, around curves and through corridors and rooms. The chassis consists of a series of articulated body pans, some or all of which are supported on wheeled axles and which are associated with a flexible spine or drawbar. No. 2,850,147.

Process for separating comminuted materials, E. J. McCue, Sept. 2, 1958. Process for separating coal fines, anthracite silt, and the like, whereby it is possible to effect a complete and exact separation in the initial pulp cell regardless of the particle sizes. The solid material is passed through a liquid body which is covered with a film of oil. Pulp is withdrawn and projected through the film back into the pulp body, causing the pulp to resurge above the oil film. The coal values are concentrated very completely. No. 2,850,164.

Shuttle conveyor and tripper station therefor, R. F. Boersma (assigned to Goodman Mfg. Co., Chicago, Ill.), Sept. 9, 1958. In an apparatus for transferring materials from one means of transportation to another, provision is made of a combination shuttle conveyor and tripper

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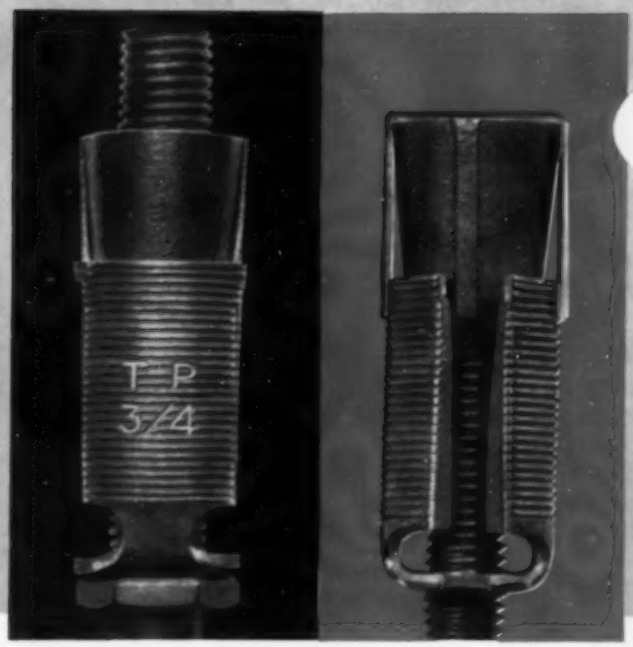
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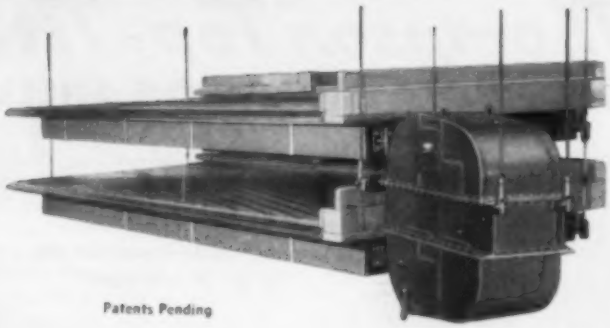
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CONCENCO PRODUCTS

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Patents *(Continued)*

station, the latter being arranged to discharge upon a cross conveyor while the shuttle conveyor is in motion. No. 2,851,150.

Loading machine, K. Rosetz, Sept. 9, 1958. Coal excavating machine having cutter and conveyor discs contra-rotating. The discs have radial cutting grooves in their working faces. These discs cut coal readily, and the machine works a relatively broad area in one pass. No. 2,851,143.

Extensible conveyors, R. F. Lo Presti and J. R. Madeira (assigned to Goodman Mfg. Co., Chicago, Ill.), Sept. 9, 1958. Improved extensible, flexible strand-supported belt conveyor, whereby the troughing action of the idler assemblies may be had at a movable end section. Additional troughing rollers may be placed readily in position at the outby end of the tail section. No. 2,851,149.

Flexible frame conveyor, R. A. McCallum (assigned to Goodman Mfg. Co., Chicago, Ill.), Sept. 9, 1958. An improved arrangement for correctly aligning the troughing rollers of an endless flexible frame conveyor. No. 2,851,851.

Hydraulic circuit for movable section of flexible strand conveyors, M. G. Carlson (assigned to Goodman Mfg. Co., Chicago, Ill.), Sept. 9, 1958. Improved hydraulic circuit for maintaining uniform tension upon the support strands of an extensible conveyor of the type where the conveying reach is supported upon strands. No. 2,851,153.

Mine roof cable support, G. G. Truax, Sept. 9, 1958. Design for a simple, inexpensive support device for engagement under the head of a roof bolt when the latter is set into position in a mine roof, said device then being available to support such mine facilities as cable, water pipes, etc. No. 2,851,239.

Cutter chain slack takeup mechanism for variable height boring type miner, J. C. Salmons (assigned to Goodman Mfg. Co., Chicago, Ill.), Sept. 9, 1958. A takeup mechanism for the endless cutter chain of a boring type miner, whereby the slack of the chain will be substantially constant at all times irrespective of the distance between cutter chain guides. No. 2,851,260.

Cutter chain construction, C. B. Krekeler, J. R. Cartlidge and A. O. Bruestle (assigned to The Cincinnati Mine Machinery Co., Cincinnati, O.), Sept. 9, 1958. In the mining of coal by an apparatus having cutter chains, means and a method are provided for breaking up

(Continued on p 68)

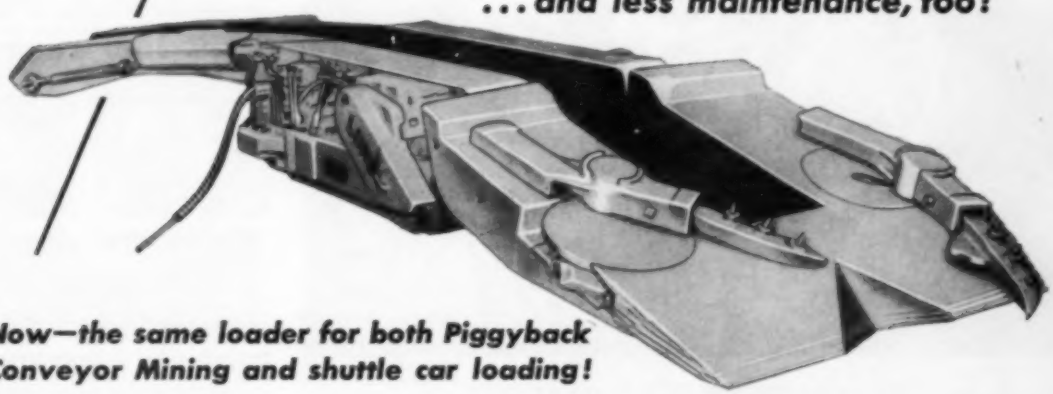
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With its counter-balanced head and swing boom, the LONG 188-D is specifically designed to work with Piggyback* Mining as well as with shuttle cars. The swing boom feature is an advantage in most Piggyback applications and permits greater versatility with the same loader—even permitting the use of Piggybacks and shuttle cars on the same section.

Time studies prove that the 188-D outperforms any loader for shuttle car loading. Its 25¾-inch height makes it the lowest, high capacity loader on the market. Its unique head design, with flat digging angle and recessed digging arms, permits lifting the head as much as 10 inches off the mine bottom without the strokes of the digging arm exceeding the overall height of the machine. This recessed arm feature has an important effect on actual working height, since in other designs the rear stroke of the gathering arms projects above the overall height of the machine.

In the straightforward, simplified design of the 188-D, there are only a fraction as many control and mechanical parts as in ordinary loading machines. For example, there is only one main speed reducer (instead of four) and only one motor and control. The single 40 horsepower compound wound motor, unlike smaller series wound motors, maintains speed and loading rate in toughest going.

The result—the LONG 188-D is easier to understand; operation is more efficient with less downtime and maintenance; you save on spare parts inventory; upkeep is simplified and easier to perform.

And you get all these advantages to boot!

Lower first cost • High capacity operation at lowest cost per year • Single 40 HP electric motor drives all machine operations—provides maximum digging and tramming power • All functions are controlled hydraulically from a single bank of control valves • Long wheel base and wide tracks give exceptional stability and positive operation • Lowest operating height (25¾") of any high capacity loader.

*Trade marks Reg. U.S. Pat. Office

For details or a demonstration, write . . .

Modernization on the 88 and 188 designs is simple. Any 88 or 188 in the field may be modernized to the latest 188-D design at reasonable cost.

The LONG Company
Oak Hill, W. Va.



Tuffy® Wire Rope



"Preventative Maintenance" Will Give You Longer Wire Rope Service

Every motorist knows the importance of proper lubrication for cars. It's essential for wire rope, too. For wire rope is a "machine" of precision moving parts. And friction is enemy No. 1 of all machinery.

Lubrication during fabrication

There are two distinct phases of lubrication: in manufacture, and in use. Wire rope engineers consider the lubricant as part of the rope; the kind, consistency and amount of lubricants are controlled and applied as required. Applications are usually made hot for the inside and external surfaces.

Lubrication in the field

Here only an external application of lubricants is possible. It must penetrate to the inside of the rope to get a film of oil between the strands and the core. The lubricant can be applied either hot or cold, depending on its penetrating quality.

To find the best lubricant for your wire rope, talk to a local oil company engineer. He'll recommend the oil and method of application best suited to your needs.

How much and how often?

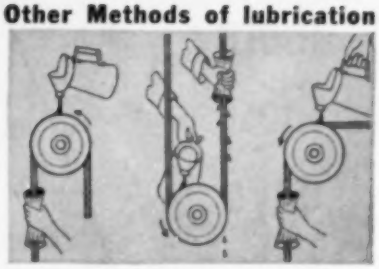
There's no set rule. It depends on service conditions. The heavier the duty, or the greater the number of bends, or the more corrosive the fluids in which the rope operates, the more frequent should be the lubrication. Remember one thing. The core is not an oil reservoir for external lubrication of the rope. No such action takes place. The oils "built" into the fiber core during its fabrication are to preserve and lubricate the vegetable fibers, not the external steel wires.

Two Types of "home-made" oiling devices



They're simple and do a good job. One is for vertical ropes, the other for horizontal. A heavy crankcase oil, cylinder oil or similar lubricant, preferably heated, is placed in the lubricators when the rope is run through.

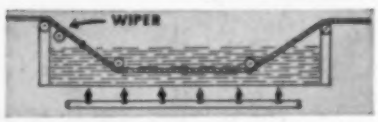
Other Methods of lubrication



The pour-on method for manual lubrication is effective when penetrating, yet adhesive, oil is used. Oil should be hot. Hold the wiping swab BEHIND the sheave. This catches any excess oil that would be carried on along the rope.

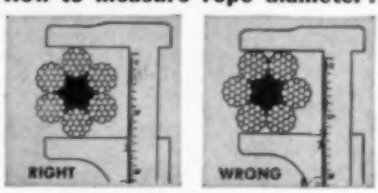
Metal split box for bath treatment has a burlap collar or wiper at outlet end.





Hot bath method of applying heavier-bodied lubricant at high temperature. Gas burners or steam heat may be used. Pre-heated lubrication is always more penetrating. Rope should run through slowly to insure penetration.

How to measure rope diameter:



Use a machinist's caliper. Be sure to measure the widest diameter.

How to measure tread diameter:





Select smallest sheave or drum to be used with new rope, and measure actual diameter of tread.

Sheaves with grooves corrugated with rope lay impression should be replaced with new ones before installing new wire rope.

New ropes are usually over-size. It is advisable to have groove diameters of sheaves or drums as large as the actual calipered diameter of the new rope, or slightly larger. We recommend sizes as follows:

58-4

Tips



Recommended sizes:

Diameter of Rope	Minimum Dia.	Maximum Dia.
1/4-5/16	+ 1/64"	+ 1/32"
3/8 - 3/4	+ 1/32"	+ 1/16"
7/8 - 1 1/8	+ 3/64"	+ 3/32"
1 1/4 - 1 1/2	+ 1/16"	+ 1/8"
1 5/8 - 2 1/4	+ 3/32"	+ 3/16"
2 3/8 and larger	+ 1/8"	+ 1/4"

How to check groove diameter:



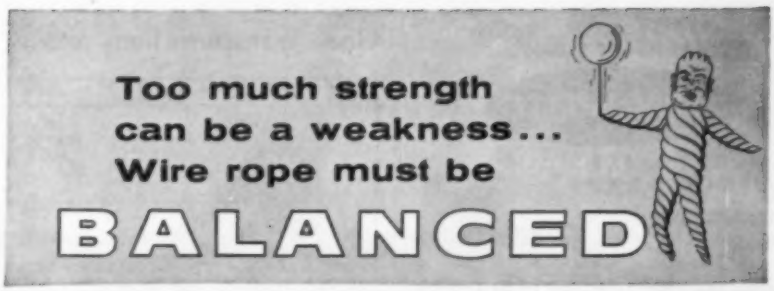
Ordering is ABC-Simple!

No complicated codes or long list of specifications. Just say "Tuffy," give type (Scraper Rope, Dozer Rope, etc.), length wanted and size. Just that easy!

Good Man to Know — Your Nearby Union Wire Rope Distributor

Whether your wire rope need is a scheduled replacement or a red-hot emergency, your Union Wire Rope distributor is ready with "right-now" service. He keeps varied stocks of Union standard constructions and the Tuffy Special Purpose Ropes. And he's backed by quick service from his nearby Union Wire Rope depot.

If it isn't rope you need, but advice on a wire rope problem, he's just as ready to help. If you don't know your Union Wire Rope distributor already, look under "Wire Ropes" or "Slings" in your telephone directory yellow pages.



Sometimes extra strength is heavily stressed in selling wire rope. While strength is important in every operation where wire rope is used, it is not the only important quality, and there are cases where excessive strength is a liability.

For example, the manufacturers of scrapers have designed the components of their equipment to take certain loads. These loads are controlled by or subject to the ultimate strength of the rope. Larger ropes with their accompanying higher strength do not break but *the equipment itself begins to* break up. Another feature of scraper rope is resistance to crushing. Strength is not the factor which controls the best design to resist crushing.

Union Wire Rope gives you the PROPER BALANCE of strength, toughness, flexibility and other properties most desirable for rope efficiency and long life. Don't settle for less. Your Union Wire Rope distributor has the BALANCED rope for every use.

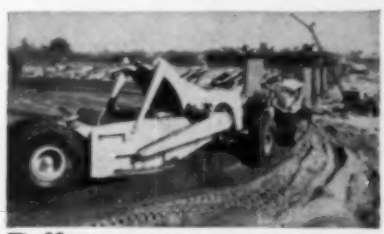
Special Purpose Ropes: tailored & BALANCED for special uses



Tuffy BALANCED Slings & Hoist Lines

Top-performing team in every type of materials handling. Tuffy Slings are made of a patented, machine-braided fabric; stays extra flexible, can't be seriously hurt by knotting or kinking. Tuffy Hoist Line is a special construction of super flexibility and toughness.





Tuffy BALANCED Scraper Rope

It's flexible enough to withstand sharp bends, yet stiff enough to resist looping and kinking when slack. Moves more yardage per foot because it's specially built and balanced to take the beating of drum-crushing abuse.





Tuffy BALANCED Dozer Rope

Built to give you longer service with less downtime. 150' reels of 1/2" or 9/16" mounted on your dozers allow you to cut off worn sections without wasting good rope. Put Tuffy Dozer Rope on the job and watch costs go down!





Tuffy BALANCED Dragline Rope

Made to give you maximum abrasive resistance with super flexibility. Rides smoothly on grooves; hugs the drum when casting for full load. Consistently dependable in handling any material — wet or dry dirt, sand, gravel, rock, cement or minerals.



union Wire Rope **corp.**

SUBSIDIARY UNITED STATES STEEL CORPORATION

217 Manchester Ave. Kansas City 26, Mo.

Specialists in high carbon wire, wire rope, braided wire fabric, stress relieved wire and strand.

Thirty-six

STURDILITE

HEAVY DUTY FLOOD LAMPS *used on*





Whether it's this colossal Marion shovel with a 70 cu. yard bite, or medium size or small machines, STURDILITES are providing better light, longer lamp life, at lower cost, for users of all types of mobile mining and construction equipment.



STURDILITES are recognized the world over as standard equipment where vibration, shock and generally rough treatment present lighting problems.



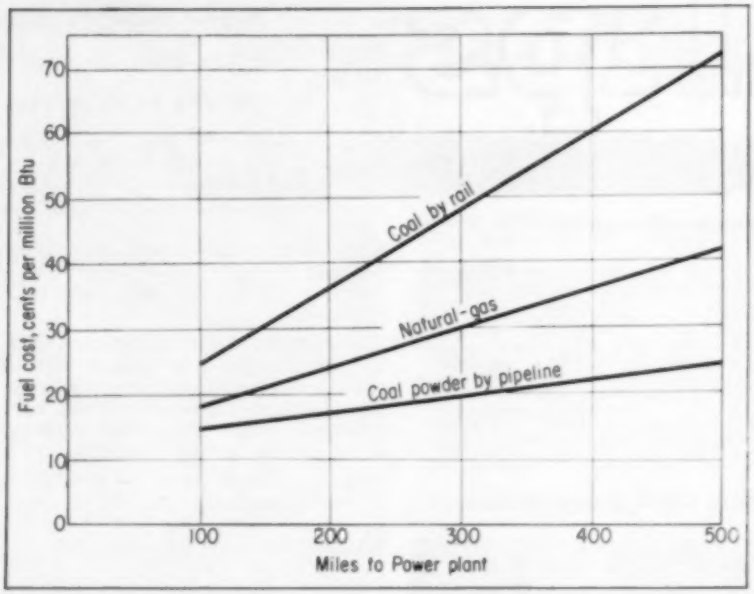
High and low voltage models for every requirement. If not available at your dealer write direct for complete information.

* Trade Mark Registered



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PHOENIX PRODUCTS CO.
4737 N. 27 ST., MILWAUKEE 9, WISCONSIN

Coal Transportation



How Fuel Costs at Power-Plant Boilers Compare for Rail and Pipeline Movement

Coal: Mine price, $3 per ton; rail freight, $3 per ton per 100 mi.

Natural gas: Pipeline collected, 12c per MCF; pipeline transportation cost, 6c per MCF per 100 mi.

Dry coal powder, 95% air volume: Mine cost, $3.25 per ton; pipeline transportation cost, 6c per MCF per 100 mi; line capital cost, 2c per million Btu per 100 mi.

Dry Pipelining . . . Natural Gas v. Coal

In further development of the cost advantages of dry pipelining of coal (*Coal Age*, May, 1958), Theodore Nagel offers the following comparison of costs for natural gas and fluidized coal.

"Starting with 12,500-Btu coal and fluidizing at a rate of 10,000 Btu per cu ft, or 2,500 cu ft per ton (25,000,000 Btu), the equivalent in natural gas would be 25,000 cu ft at the usual gas rate of 1,000 Btu per cu ft.

"At a pipeline collected cost of 12c per thousand cu ft of gas, the cost of gas equivalent to a ton of coal would be $3. Pipelining 25,000,000 Btu in gas form to a power plant 100 mi distant, at a rate of 6c per thousand cu ft, would be $1.50, making the gas cost $4.50 at the power plant. If the mine price of coal was $3 per ton and the rail freight rate also was $3 per 100 mi, the delivered cost for coal would be $6, or 133% of the gas cost.

"Now consider pipelining fluidized coal at the same operating cost as natural gas, or 6c per thousand cu ft per 100 mi, each cubic foot of fluidized coal carrying 10,000 Btu compared to 1,000 Btu per cu ft for natural gas. The total transportation cost would be 15c per 100 mi for dry pipelined coal compared with $3 for equivalent coal by rail and $1.50 for pipelined natural gas.

"Coal cost at a power plant 100 mi distant would be $3.15 per ton, or 70% of the gas cost of $4.50 for 25,000 cu ft and 53% of the $6 per ton for rail-transported coal.

"If the distance to the power plant was 600 mi and plant requirements were equivalent to 1,000,000 tons of coal per year, the saving in favor of dry pipelining coal would be $5,100,000 per year since natural gas would cost the equivalent of $9 per ton, compared to $3.90 for fluidized coal by pipeline.

"Conclusion: With rail transportation of coal, the advantage of the gas pipeline increases with each mile to market. But when coal is pipelined dry, the situation is reversed and the cost differential is in favor of coal because of the much higher number of Btus in each cubic foot moved through the line."



CONTRACTORS: SPECIFY YOUR POWER →

STANDARDIZE ON CUMMINS

MORE THAN 300 MODELS of construction equipment are available with Cummins power!

FUEL COST SAVINGS alone will be as much as 50¢ per operating hour!

CUMMINS POSITIVE DIRT PROOFING SYSTEM adds years to the life of the engine!

CUMMINS FIELD SERVICE availability insures 'round the clock operation!



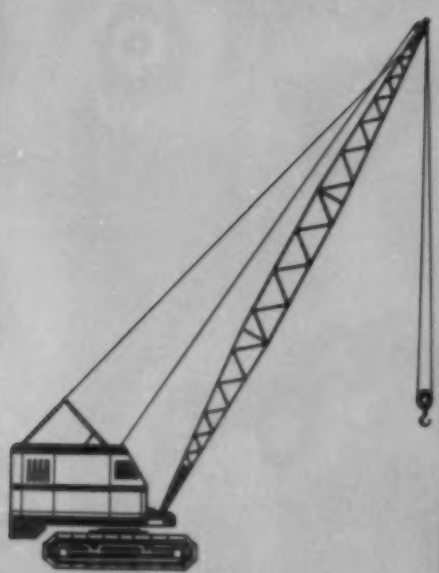
BOTTOM DUMP

Size	Autocar	Euclid	Kenworth	KW-Dart	Le Tourneau Westinghouse
16 Yds. (Struck)					C
17 Yds. (Struck)		26TDT-122W			
25 Yds. (Struck)		33LTD-132W			
35 Yds. (Struck)	AP-25T			70 BDW	
COAL HAULERS					
25 Tons		26FDT-121W			
40 Tons		33LDT-133W			
50 Tons	AP-25T			50S-BDT	
55 Tons		24TDT-120W		70S-BDT	
70 Tons			803-T		

TRACTOR-SCRAPERS

Size (cu. yds. heaped)	Clark	Euclid	I.H.	Le Tourneau Westinghouse	M-R-S	Wagner	Wooldridge	Westfall
5.7						IND-6		
9						IND-9		
10.5	110							
12						IND-14		100
13			2T55					
16		26DT-18SH						
18				C				175
19	210							
21			2T75				CW-215	
25		33TDT-165H			125	IND-24		
26								Performer
27				B	150		CW-320	
29	310							
32		33LDT-325H			190			
41.5					200			
48					250			





CRANES

Size (tons)	American Hoist	Baldwin Lima	Bay City	Dominion	Gar Wood	Insley	Le Tourneau Westinghouse	Link-Belt Speeder	Marion	Orton Crane	Thew
6										3E-UDT	
7.5										6E-UDT	
10										8E-UDT	
15										12E-UDT	
20		34, 25-T			75BT		C			16E-UDT	
21									25-M		
25		34-T, 34-TS, 44	600		100BT			HC-88	25-MTC	22E-UDT	
27									43-M		
30		44-T	720				B	HC-98	37-MTC		SP-530
32										26E-UDT	
35		54-T 604 703		400		WB		HC-108			HC-530 (Both MC-503 Carriers TSP-530W and Turntables)
40	505C	64							43-MTC	32E-UDT	
42									362		
45						WB					
50		64-T, 64-SC, 703-SC, 803								42E-UDT	
60				550							
70		1201C, 86-T									
75									87-M		
80									93-M		
84									101-M		
85		1250									
100		1250-SC									
160									111-M		

REAR DUMP TRUCKS

Size (Tons)	Autocar	Euclid	I.H.	Kenworth	KW-Dart	Le Tourneau Westinghouse	Mack	Oshkosh	Wooldridge
10					10S				
15	AP-15	80FD			15SL		LRX		
18		94FD	PH65	801					
22		36TD 46TD				C		W-2500	
22½							LVX		
24			PH95	802					
25	AP-25				25S 25SL				CWD-214
27		66TD							
28								W-2800	
30					30SL		LRSW		
34							LRVSW		
35					35T 35SL	B			CWD-321
36				803					
40	AP-40	10FFD							
48				802-B					
50		4LLD			50T				
64				803-B					





TRACTORS

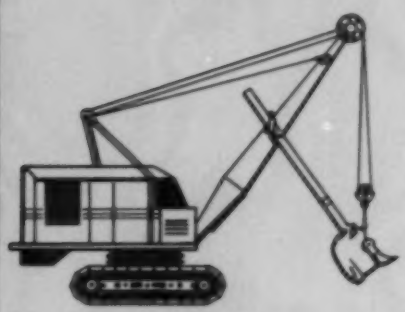
Size (H.P.)	Eimco	Le Tourneau Westinghouse	M-R-S	Wagner	Westfall
110				IND-6	
130				IND-9	100
160	105-T			IND-14	
175					175
210		C			
220			125	IND-18	Performer
262			150		Performer
300				IND-24	
310			190		
335			200		Performer
600			250		



TRACTOR SHOVELS

Size (yds.)	Clark	Eimco	Frank G. Hough (IH)	Mixermobile	Pettibone-Mulliken	Thew
1½		105 (Excavator)		LD5PD	125	
1¾						ML-153
1½				LD7D		
2¼			H0D		175	
2½				LD7AD		
2¾	175A	105				
3½				LD8AD	250	
4	275A					
4½				LD12AD		
6	375A			LD15AD LD12AD		

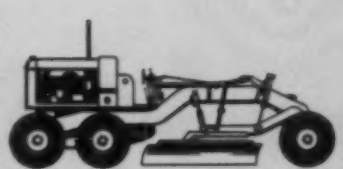
SHOVELS



Size (yds.)	American Hoist	Baldwin Lima	Bay City	Bucyrus-Erie	Dominion Engr. Wks.	Insley	Koehring	Link-Belt Speeder	Manitowoc	Marion Power	Orton	Thew
¼											3E-CDT	
½	300	34						LS-88		35-M	6E-CDT	
1	500	44	60			WB		LS-98	1600	43-M	8E-CDT	
1¼		64							2000		12E-CDT	Lorain 56
1½	700	604	72	39-B	400			K-360		362	15E-CDT	
1¾		703						K-365 K-370 K-375			22E-CDT	
2		802		51-B			805		3000		25E-CDT	
2½		803			550					93-M	30E-CDT 40E-CDT	
2½				54-B					2500			
3				71-B			1205	K-600 K-600-L	3600	101-M		
3½		1201										
4		1601		88-B					4500	111-M		
5									4500			
5½									4500			

GRADERS

SIZE (H.P.)	ADAMS	GALION	HUBER-WARCO
90	330		
100		104	
115	440		
123	550		
130		T-500 110	6-D2
135	550-T		
160	660	T-600 160	7-D2
190	660-T	T-700	



TRACTOR-DOZERS



Weight (lbs.)	Clark	Eimco	Le Tourneau Westinghouse	Wagner	Westfall
16,500					100
20,100				IND-11	
22,500					175
27,600				IND-18	
33,300	180				
34,600			C		
37,000		105 105-T			
40,000					Performer
51,300	280				
74,150	380				
104,000	480				

SPECIALIZED CONSTRUCTION AND MINING EQUIPMENT MANUFACTURERS WITH CUMMINS (STANDARD OR OPTIONAL) POWERED MODELS

AIR COMPRESSORS
Chicago Pneumatic Tool Co.
Joy Manufacturing Company
Worthington Corporation

BATCH PLANTS
Barber-Greene Company
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Iowa Manufacturing Co.

BUCKET LOADERS
Barber-Greene Company
Pettibone-New York Div.

COMPACTORS
Buffalo—Springfield Roller Company

CRANE CARRIERS
Baldwin-Lima-Hamilton
Crane Carrier Canada Ltd.
Crane Carrier Corporation
Hendrickson Manufacturing Company
KW-Dart Truck Company
Sicard, Inc.
The Maxi Corporation

CRUSHING PLANTS
Bros Inc.
Diamond Iron Works
Eagle Crusher Company
Iowa Manufacturing Company
Lima Austin-Western
Universal Engineering Company

DITCHERS
Barber-Greene Company

DRILLS
Reich Brothers Manufacturing Co.

MIXERS
Barber-Greene Company
Bros Inc.
Iowa Manufacturing Co.
Pettibone-Wood Manufacturing Co.

PAVERS
Chain Belt Company (Rex)
Iowa Manufacturing Co.
Worthington Corporation

ON AND OFF-HIGHWAY DUMP TRUCKS IN 67 MODELS BY 10 MANUFACTURERS



REPOWER WITH CUMMINS

32 models for every application

HP	Model
100 h.p.	J-6
110 h.p.	JF-6
115 h.p.	HR-4
115 h.p.	HRC-4
130 h.p.	NHC-4
130 h.p.	JN-6
130 h.p.	NT-130
160 h.p.	JS-6
160 h.p.	H-6
165 h.p.	NT-4
175 h.p.	JNS-6
175 h.p.	HR-6
175 h.p.	JT-6
180 h.p.	NT-180
180 h.p.	NH-180
190 h.p.	HRF-6

HP	Model
195 h.p.	NH-195
200 h.p.	HS-6
200 h.p.	NT-200
220 h.p.	NH-220
240 h.p.	HRS-6
250 h.p.	NT-6
262 h.p.	NTO-6
265 h.p.	L-6
290 h.p.	NHS-6
300 h.p.	NRT-6
320 h.p.	NHRS-6
320 h.p.	LR-6
335 h.p.	NRTO-6
450 h.p.	NVH-12
450 h.p.	LRT-6
600 h.p.	VT-12

Only Cummins offers a diesel for every construction machine . . . with these features!

- **Cummins Engineered Repowering.** Job-site or shop conversions. Installations are made from factory approved repowering studies.
- **Cummins Long Engine Life.** Better heat dissipation afforded by 4-cycle design, coupled with Cummins sturdier construction of crankshaft and other components, means longer engine life for you.
- **Cummins Economy.** The highly efficient Cummins designed combustion chamber provides maximum fuel economy—saving as much as 50¢ per operating hour!
- **Cummins PT Fuel System.** With only 188 parts, as much as 275 fewer parts than competitive systems, you have simplicity and economy of maintenance.
- **Cummins Dirt-Proofing.** Air cleaners, caps, connections, oil system and all entrance points for destructive grit have been made dirt-proof by Cummins proven protective system.
- **Cummins Service.** Geared to your on-the-job service needs —just call your local Cummins Distributor and he'll be there —more than 300 service points throughout the U.S. and Canada.

CUMMINS ENGINE COMPANY, INC., COLUMBUS, INDIANA

EXPORT — CUMMINS DIESEL EXPORT CORPORATION — COLUMBUS, INDIANA, U. S. A. — CABLE: CUMDIEX
OVERSEAS FACTORY — CUMMINS ENGINE COMPANY LIMITED — SHOTTS, LANARKSHIRE, SCOTLAND — CABLE: CUMSCOT SHOTTS TELEX

Litho in U.S.A.

Preparation Facilities

Gowen Coal Co., Gowen, Pa.—Purchased from Deister Concentrator Co., Inc., one Concenco "77" diagonal deck washing table with twin decks to handle barley size anthracite coal.

Gay Mining Co., Gilbert Yards, W. Va.—Purchased from Diester Concentrator Co., Inc., 12 Super Duty diagonal deck No. 7 washing tables, model HCRD, with single decks to clean ¼x0 fraction.

Jewell Ridge Coal Co., Jewell Valley, Va.—Contract closed with Heyl & Patterson, Inc., for eight double-deck wet concentrating tables, two dewatering screens, two centrifugal dryers, 23 Heyl & Patterson 8-in diameter cyclones, vacuum filter, Heyl & Patterson fluid bed dryer, together with required belt and flight conveyors, hoppers, bins, chutes, and piping to handle ¼x0 at a rate of 160 tph. Completion, early 1959.

Rochester & Pittsburgh Coal Co., O'Donnell Mine No. 2, Glenville, W. Va. — Contract closed with Heyl & Patterson, Inc., for run-of-mine crushing and handling equipment, Baum-type jig, four primary dewatering screens, Reineveld centrifuge, eight 14-in Heyl & Patterson cyclones, vacuum filter, Heyl & Patterson fluid bed dryer, and loading out facilities to handle 4x0 at a rate of 400 tph. Completion, spring of 1959.

Allen & Garcia Co. for U.S. Steel Corp., Maple Creek Plant, New Eagle, Pa.—Contract closed with Fairmont Machinery Co. for one 18-ft diameter Chance cone and auxiliary equipment. Completion, early 1959.

Bituminous Output

YEAR TO DATE	PRODUCTION
Sept. 13, 1958	268,403,000
Sept. 14, 1957	347,142,000

1958 output 22.7% behind 1957.
A month earlier output was 23.4% behind 1957.

WEEK ENDING	PRODUCTION
Sept. 13, 1958	8,345,000
Sept. 14, 1957	10,089,000

Anthracite Output

YEAR TO DATE	PRODUCTION
Sept. 13, 1958	14,748,000
Sept. 14, 1957	18,164,000

1958 output 18.8% behind 1957.
A month earlier output was 19.3% behind 1957.

WEEK ENDING	PRODUCTION
Sept. 13, 1958	483,000
Sept. 14, 1957	553,000

Christopher Mining Inc., Christopher No. 9 mine, Buckhannon, W. Va.—Contract closed with Fairmont Machinery Co. for fine coal cleaning plant including 3-compartment jig, CMI dryer and allied equipment. Completion, last quarter, 1958.

Pocahontas Fuel Co., Itmann Colliery, Itmann, W. Va.—Contract closed with Fairmont Machinery Co. for installation of froth-flotation and filtering equipment, water clarification equipment and miscellaneous conveyors. Completion last quarter, 1958.

Allied Chemical Corp., Semet-Solvay Div., Tralee Mine, Tralee, W. Va.—Purchase authority awarded to The Daniels Co., Contractors, Inc., for installation of a complete froth flotation coal recovery plant together with water clarification system using slurry conditioning, froth-flotation cells, vacuum filtration for coal, thickening and flocculation of refuse, vacuum-filtration of refuse, and reagent balance apparatus.

Page Coal & Coke Co., Stephenson, W. Va.—Contract closed with Kanawha Mfg. Co. for coal and rock handling

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. . . no other trolley contactor can match the features of this NEW GEMCO

CUTS 95% OF MAINTENANCE

NO FRICTION—The trolley shoe never touches the contactor

UNLIMITED LONG LIFE—Nothing to wear out because there is no physical contact between the contactor and trolley

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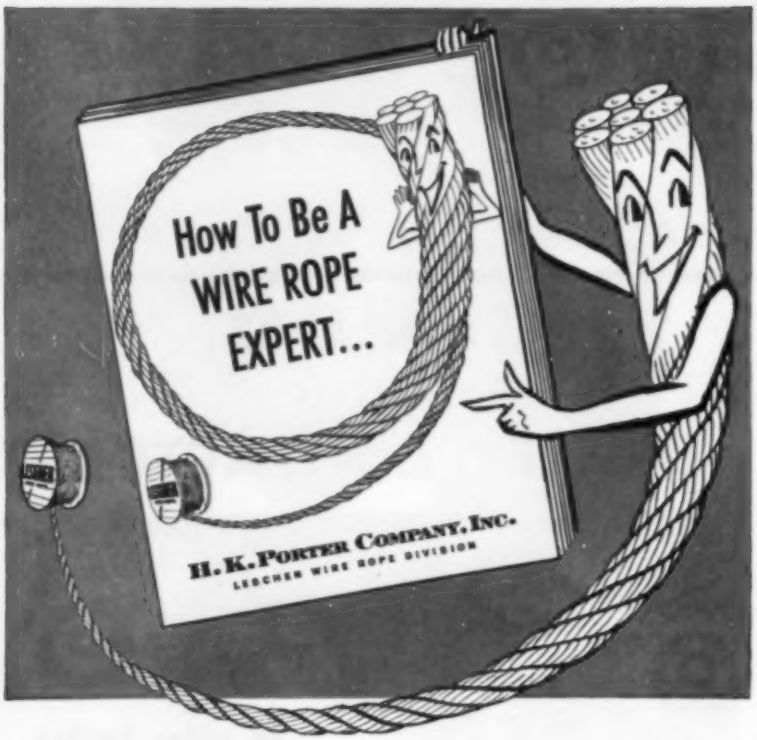
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Knowing how to select the best wire rope for the job not only helps reduce costs, but it may also help you to get that job done more efficiently. You'll find the facts you need to know in the book shown above. It has been specifically edited and illustrated for easy understanding by non-technical readers. It describes the forces that tend to destroy wire rope and then, step by step, shows how to determine which wire rope construction will provide the greatest possible resistance to the destructive forces you have found most troublesome. It's an interesting and helpful aid that every wire rope user ought to have. Send for free copy today. Write H. K. Porter Company, Inc., Leschen Wire Rope Division, 2727 Hamilton Ave., St. Louis 12, Missouri.

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Red-Strand
WIRE ROPE

H. K. PORTER COMPANY, INC.
LESCHEN WIRE ROPE DIVISION

Preparation Facilities (*Continued*)

equipment consisting of trip feeder, power rotary dump, separate hoppers and feeders for coal and rock, 42-in mine-run belt conveyor spanning river, 200 ton mine-run storage bin from which coal is fed to a Lecco picking table-screen, and then into plant. Capacity, 250 tph.

Rochester & Pittsburgh Coal Co., Indiana, Pa.—Purchased from Jeffrey Mfg. Co. one 7-ft, 3-compartment, 8-cell, air-operated jig to clean 5x0 Pittsburgh-seam coal at a rate of 400 tph.

Blaschak Coal Co., Mahanoy City, Pa.—Purchased from Deister Concentrator Co., Inc., one Concenco "77" diagonal deck washing table with twin decks to handle No. 5 Buck size anthracite coal.

Harman Mining Corp., Harman, Va.—Purchased from Deister Concentrator Co., Inc., eight Concenco "77" diagonal deck washing tables with twin decks to handle ⅜x0 bituminous coal.

Pocahontas Fuel Co., Deerfield Colliery, Covel, W. Va.—Contract closed with Fairmont Machinery Co. for Denver filtering equipment. Completion, November, 1958.

Fry Coal Co., Mercersburg, Pa.—Contract closed with Western Machinery Co. for a WEMCO HMS drum to treat 60 tph of 5x¼-in bituminous coal.

Meetings

National Safety Council; Coal Mining Section of the National Safety Congress, October 20-22, Chicago. Write R. L. Forney, Secretary, National Safety Council, 425 N. Michigan Ave., Chicago 11, Ill., for information.

Illinois Mining Institute; 66th Annual Meeting, October 24, Hotel Abraham Lincoln, Springfield, Ill.

Independent Mineral Producers Assn; Annual Meeting, October 30, Hotel Roosevelt, Pittsburgh, Pa.

American Institute of Mining, Metallurgical and Petroleum Engineers, Pittsburgh Section; 13th Annual "off-the-record" Meeting, November 7, Penn-Sheraton Hotel, Pittsburgh, Pa.

Pennsylvania - Anthracite Section American Institute of Mechanical Engineers; Fall Meeting, Oct. 24, Mayfair night club on Rte. 315, midway between Scranton and Wilkes-Barre.

Epuipment Approvals

Nine approvals were issued during August.

Lee-Norse Co. — Model CM47-1E miner; three motors, each 50-hp, 440 volts, alternating current. Approval 2-1392A. Aug. 6.

Carpenter Mfg. Co. — Type P8F-5 dry-cell hand lamp. Approval 1031. Aug. 11.

Ensign Electric & Mfg. Co.—Type LJGG skid-mounted distribution box; one 600-amp frame, one 225-amp frame, and two 100-amp frame circuit breakers, 220/440 volts, alternating current. Approvals 2-1393 and 2-1393A. Aug. 12.

Ethel Chilton Mines, Inc.—Rebuilt Joy model 6SC7E I shuttle car; three motors, each 7½-hp, 250 volts, direct current. Approval 2-1394. Aug. 13.

Lee-Norse Co.—Model CM-47 K/M Miners; three motors, each 50-hp, 230/550 volts, direct current. Approvals 2-1395 and 2-1395A. Aug. 14.

J. T. Fish & Co.—Rebuilt Joy model 6SC-3CE shuttle car; three motors, each 7½-hp, 250 volts, direct current. Approval 2-1396. Aug. 14.

J. H. Fletcher & Co.—Model DJB roof control drill; one motor, 50-hp, 220/440 volts, alternating current. Approvals 2-1397 and 2-1397A. Aug. 18.

Joy Mfg. Co. — Model 1CM-3AT continuous miner; seven motors, four 7½-hp, one 15-hp, two 100-hp, 440 volts, alternating current. Approval 2-1398A. Aug. 27.

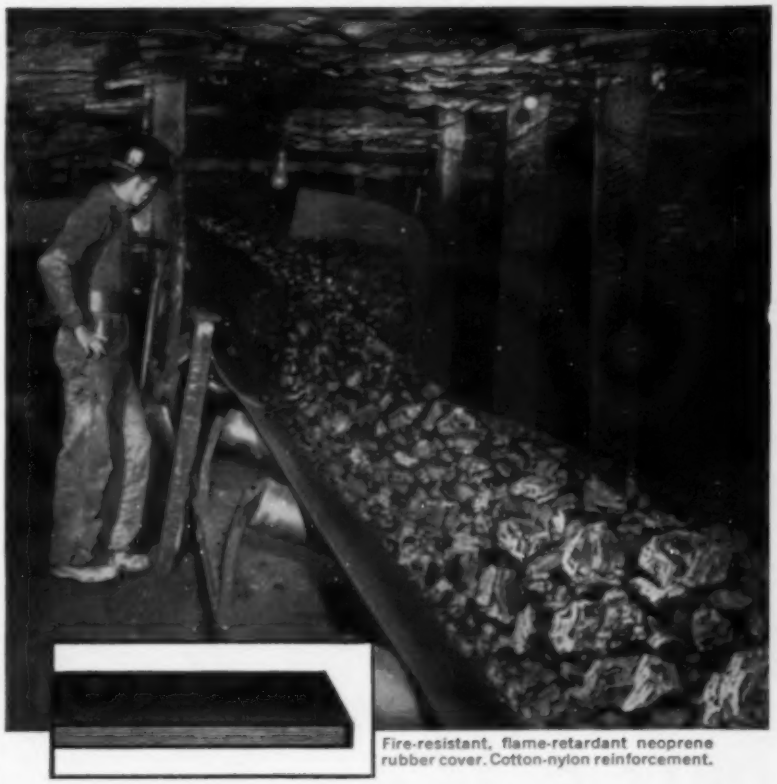
Getman Brothers — Model CD-4T 10-ton diesel-powered ore carrier for use in non-coal mines. Approval 2418. Aug. 27.

Mines, Companies *(from p 30)*

Kaiser Co., owners of the mine, said crews will work around the clock on the by-pass tunnels to re-enter the two main coal producing areas of the mine. Production is expected to resume almost immediately after the by-passes are started.

Glen Alden Corp. has plans for a new office building at the big Huber Colliery, Ashley, Pa.

The building now used as a wash house at Huber Colliery will be remodeled into a complete office building. A company official said plans also called for a new bath house to accommodate 500



Fire-resistant, flame-retardant neoprene rubber cover. Cotton-nylon reinforcement.

Rugged, reliable Quaker conveyor belting

BETTERS THE U.S.B.M. 28-11 FIRE-RESISTANCE STANDARDS

Quaker fire-resistant conveyor belting set something of a new unofficial standard when tested against the U.S. Bureau of Mines designation U.S.B.M. 28-11. Under their specified flame test, burning of the belt is permitted up to one minute after it is ignited. When Quaker belting was subjected to this test, the flame went out *immediately*, while afterglow disappeared in one-third the permitted time.

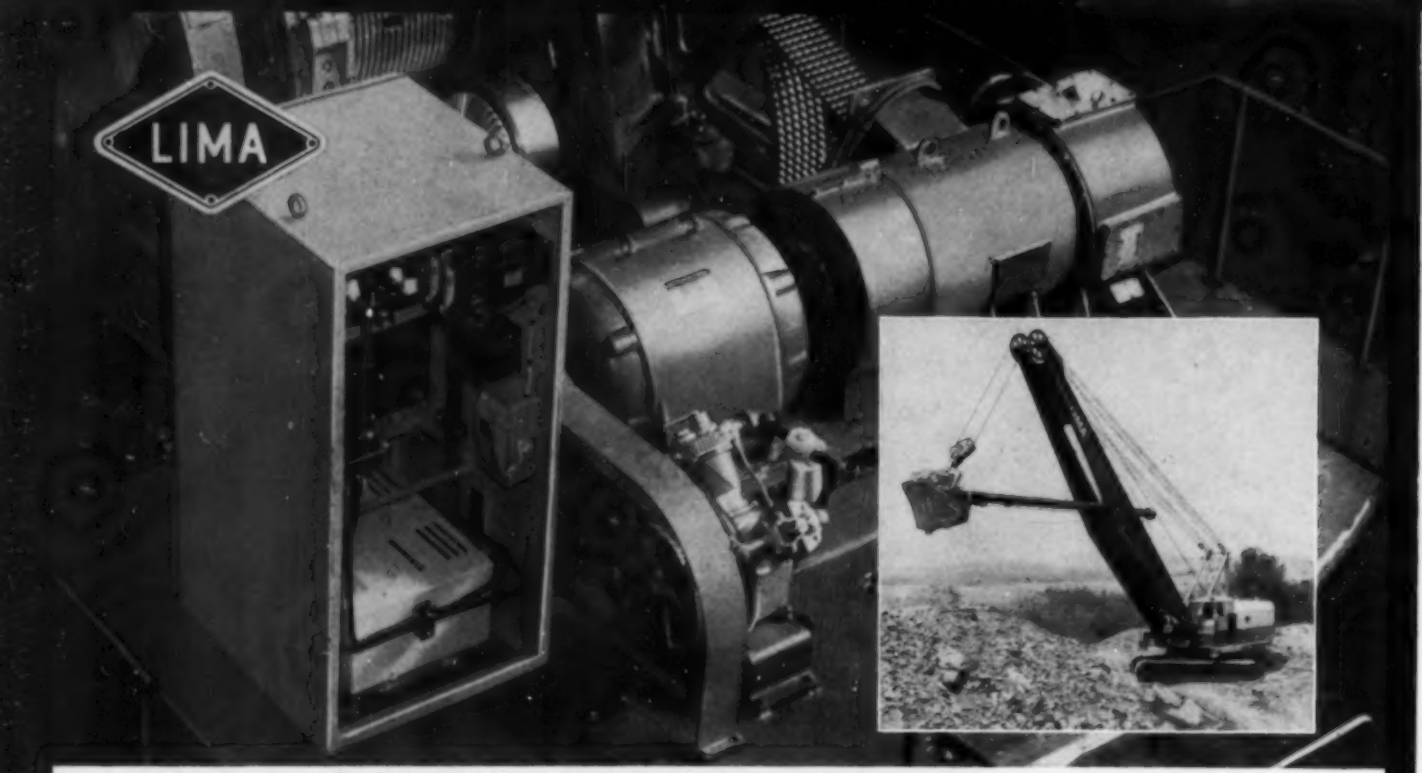
Underground safety is just one of the features of this fine conveyor belting. Quaker U.S.B.M. 28-11 is light in weight and extremely flexible, yet tough enough to take shock, impact, and the abrasive wear of heavy, jagged loads.

Get Quaker safety, service, and strength for your mine's belting. Call your Quaker industrial distributor for the full story, and for valuable assistance on *all* problems involving industrial rubber products.



FREE BELTING CATALOG
For complete information on all standard grades of Quaker conveyor belting, send for this illustrated catalog. Write today to QUAKER RUBBER DIVISION, H. K. PORTER COMPANY, INC.; Philadelphia 24, Pa., or Pittsburg, California.

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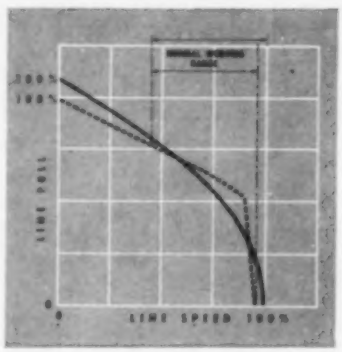
Lima's Type 2400 Electric Power Unit with AC motor and single-stage torque converter.

LIMA'S Electrical Power Unit prevents stalling, won't burn out

With Lima's optional power unit, you get power on demand through a wide operating range, and the motor will not stall or burn out under heavy load conditions. Combining an AC motor with a single-stage torque converter, it adapts actual power output to work load demand—at constant motor speed. Thus, electrically it matches diesel-torque converter performance.

Just check the performance curves—They make it clear that LIMA's new electric power unit is the perfect answer when your job calls for electrically powered machines. Available on every Lima machine—shovels to 6 cu. yds., cranes to 110 tons.

Get the full story today from your nearby Lima distributor. Or write to Construction Equipment Division, Baldwin-Lima-Hamilton Corporation, Lima, Ohio.



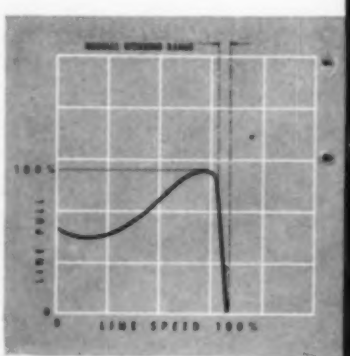
Power Performance of LIMA'S Optional Electrical Power Unit.

Power performance curve of Lima's electrical power unit (solid line) compared with that of a diesel-torque converter unit (dotted line). As can be seen, the line pull will constantly increase through a long pull down in speed range, depending upon the load applied. Even under extreme loading the motor will pull down in speed only slightly and can never be stalled.

Power Performance: AC Electric motor with direct drive—

The motor speed and torque varies as shown for line speed and pull.

With a pull down in speed of only 3% to 5%, torque rises too fast. The motor will stall quickly after peak torque is reached. Workable speed range is small, stalls are frequent.



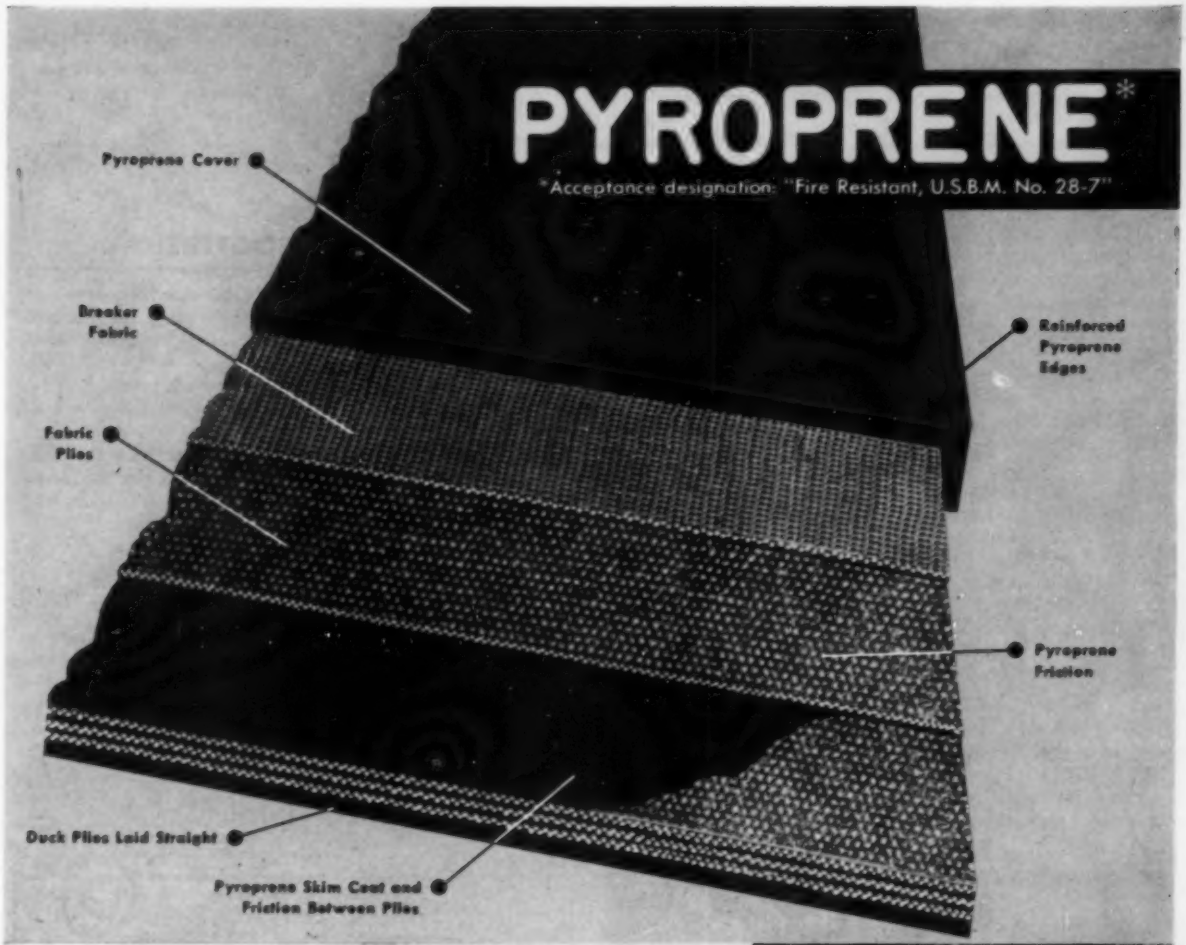
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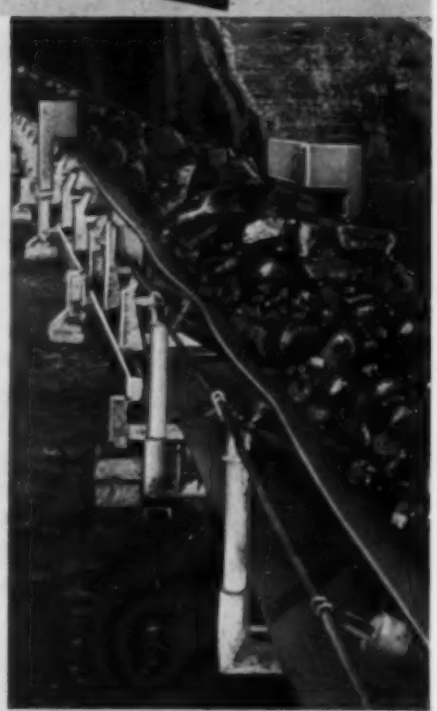
5927



What happens if fire penetrates to the carcass of a conveyor belt?

It goes out if it's a Hamilton Pyroprene belt. Fire just can't find fuel to feed on in this U.S.B.M.-accepted belt because every element is "Pyroprene Protected". The cover is all Pyroprene. The fabric plies and the breaker fabric are completely encased with 100% Pyroprene compound before the belt is built.

In addition to fire resistance, Pyroprene belting offers exceptional durability and strength. The cover will give maximum resistance to cuts, tears, gouging and abrasion; reinforced edges protect carcass at critical wear point. Breaker fabric acts as cushion for impact. Fabric plies are strength members. Skim coats increase adhesion and prevent ply separation. Write Dept. MI-105.



Serving Industry since 1870

Hamilton Rubber

MANUFACTURING CORPORATION, TRENTON 3, N. J.

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Mines, Companies (*Continued*)

mine workers. Glen Alden recently sold their office building in Wilkes-Barre, Pa., to Wilkes College for $400,000.

Junior Pocahontas Coal Co. has opened a new mine at Guyan, W. Va. on the Virginian Railway.

Present capacity is about 1,000 tons daily of mid-volatile coal of by-product quality. Tonnage is expected to increase, however, as work progresses.

The Central West Coal Co. has acquired a new mine at James, W. Va.

The new mine is under the management of the Central Pocahontas Mining Corp., a newly-formed subsidiary of Central West. Current output is 1,000 tons daily, but production is planned to increase to 3,000 tons daily by Jan. 1.

At the same time, Central West announced their appointment as exclusive agent for the output of Pine mines of Pine Township Coal Co., Heilwood, Pa. Pine Township Coal is producing 3,000 tons daily in the Moshannon coal seam.

Old Ben Coal Corp. is working on a new mine near Sesser, Franklin County, Ill.

Initial production of the mine, designated as mine 21, is planned for Jan. 1, 1960. The mine will be developed by shafts with production capacity to reach 10,000 tons daily of low sulfur, metallurgical coal. Production will be 100% by boring machines with transportation by belts.

Island Creek Coal Co. is planning a $10-million facility—mine and river-loading installation—on Opossum Creek, about 30 mi south of Wheeling, W. Va.

Indications are that the project would provide permanent employment for about 400 persons and would require about 200 new homes in the area. Island Creek plans to mine coal from 30,000 acres of land, which is estimated to have coal reserves in the neighborhood of 150-million tons.

The difficulty in the project is that the U.S. Army Corps of Engineers has the same site picked out for the proposed Ohio River Lock and Dam.

A 8,962-ft rock tunnel at U.S. Steel's Columbia-Geneva Steel Div. Columbia coal mine, Dragerton, Utah, has opened the door to vast coal deposits previously not mineable.

The tunnel, 13-ft wide and 9-ft high, replaces the old tunnel that had a 13% grade from the working face to the portal and a similar slope from the portal to the tipple. Grade of the new tunnel is about 1% from working face to tipple. A 26-ton electric locomotive will carry coal from the main terminal parting deep in the mine to the rotary dump in the tipple.

Transportation

Coal mines in east Tennessee and Kentucky are benefitting from reduced rail freight rates on shipments to Florida power plants.

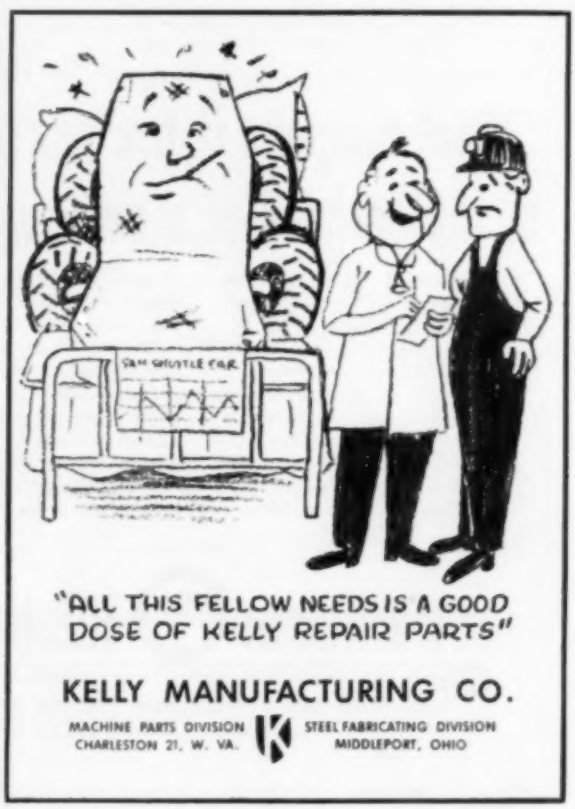
Approved this month by the Interstate Commerce Commission, the new rates, which apply to the Tampa, Fla. area, are substantially lower than those formerly in effect. The rate from the Harlan, Ky., group of mines, for example, is about $1.65 per ton lower.

Research

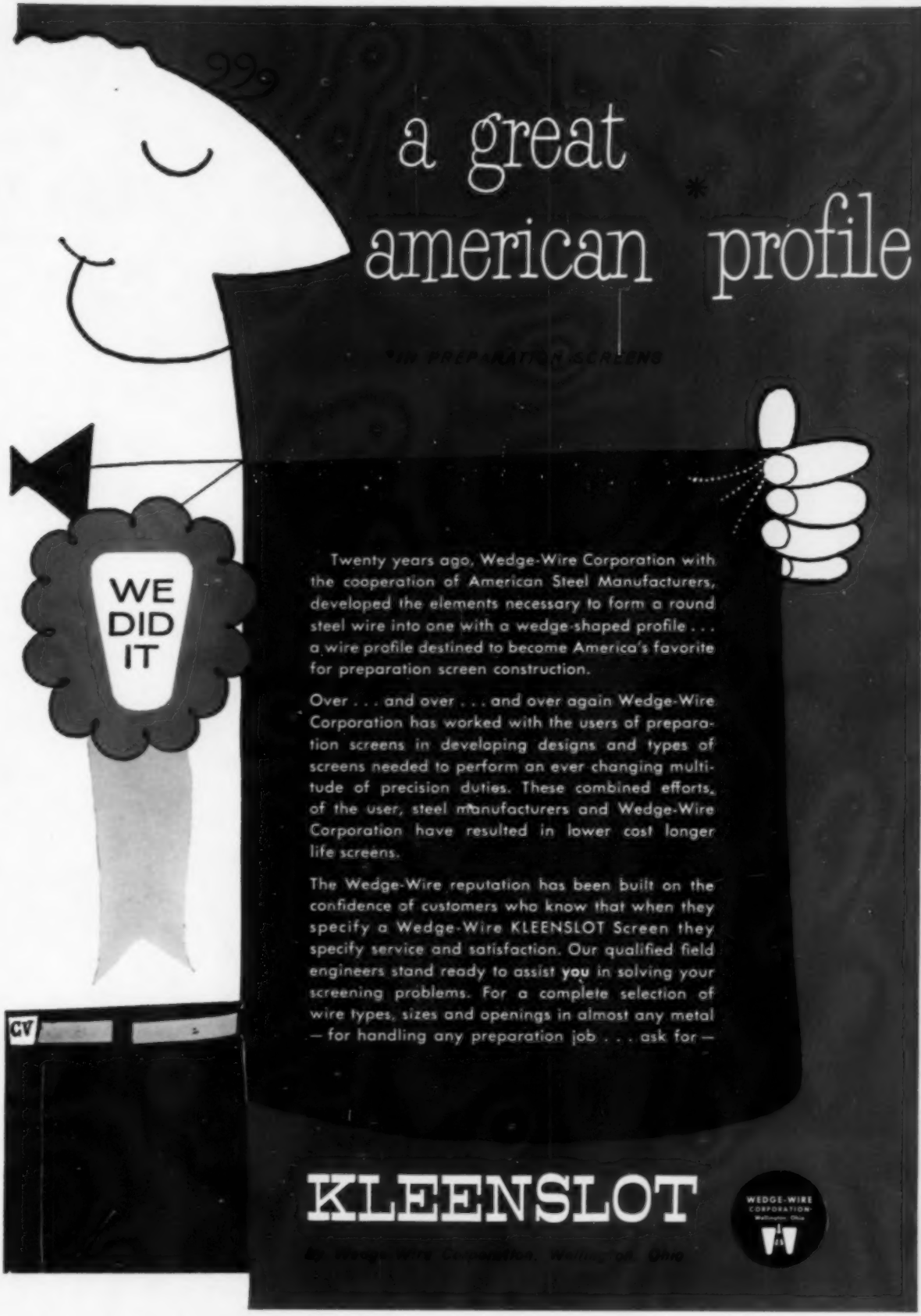
Joy Mfg. Co. has committed itself to a "stepped-up research and product development program for its Coal Machinery Div."

W. L. Wearly, Joy president, said the company's confidence in coal is based on a firm conviction that the coal in-





a great american profile



Twenty years ago, Wedge-Wire Corporation with the cooperation of American Steel Manufacturers, developed the elements necessary to form a round steel wire into one with a wedge-shaped profile . . . a wire profile destined to become America's favorite for preparation screen construction.

Over . . . and over . . . and over again Wedge-Wire Corporation has worked with the users of preparation screens in developing designs and types of screens needed to perform an ever changing multitude of precision duties. These combined efforts, of the user, steel manufacturers and Wedge-Wire Corporation have resulted in lower cost longer life screens.

The Wedge-Wire reputation has been built on the confidence of customers who know that when they specify a Wedge-Wire KLEENSLOT Screen they specify service and satisfaction. Our qualified field engineers stand ready to assist **you** in solving your screening problems. For a complete selection of wire types, sizes and openings in almost any metal — for handling any preparation job . . . ask for —

KLEENSLOT

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MORE TONNAGE PER UNIT

Because it's built to protect parts against dirt, dust, water, high bearing loads, and extremes of temperature, Sun 740A-EP helps you run a machine longer before you have to shut it down for maintenance. Hence, Sun 740A-EP helps you mine more coal.

Photo courtesy of Joy Manufacturing Company

SUN'S NEW 740A-EP GREASE HELPS YOU GET MORE TONNAGE

Sun's New Prestige® 740A-EP Grease is an all-purpose, semi-fluid, mine-machine lubricant. It pours readily, even at the lowest operating temperatures, and does not thin out excessively up to 200 F. It is water- and heat-resistant, has extreme-pressure properties, and gives excellent rust and corrosion protection.

When you use 740A-EP you . . .

- **mine more coal,** because you can run longer without shutdowns for inspection and maintenance.
- **cut operating costs,** because parts last longer.
- **simplify lubrication,** because you can use 740A-EP in place of two or three specialized lubricants.
- **use less grease,** because 740A-EP stays put.
- **increase safety,** because you get no excessive drippage. There's no need to worry about fire hazards and dangerous footing caused by gear oil slicks.

These days, when *every* miner is looking for ways to boost tonnage, but *not* his costs, a product like 740A-EP is especially interesting. Want to know the rest of the story? Call in your Sun man, or write to Dept. CA10.

SUNOCO

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ONLY TWO LUBES FOR ALL UNDERGROUND NEEDS

By using a *single* Suntac hydraulic oil and Sun's new Prestige 740A-EP Grease, you can handle *all of your daily underground lube needs* . . . cut your oil losses . . . reduce your oil inventories.

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Yes, but not good enough...

Tough competitive markets demand better quality–so this load is not for them!

Only modern preparation plants are equipped with new production techniques that upgrade coal better . . . increase tonnage-flow . . . shrink operating costs for greater profits.

Successful operators are never satisfied with a good product. Make it better with modern ideas . . . modern methods . . . modern equipment by Fairmont!

So be modern . . . go modern . . . modernize . . .

IS AN OUTMODED CLEANING PLANT
CONSUMING YOUR PROFIT DOLLARS?

FAIRMONT
MACHINERY COMPANY

FAIRMONT / WEST VIRGINIA

ENGINEERS • DESIGNERS • FABRICATORS and CONSTRUCTORS

Call Fairmont, W. Va. 1672 and a Fairmont Engineer will consult with you and analyze your facilities for possible cost and savings.

Research (*Continued*)

dustry will grow importantly to meet both expanding energy needs and metallurgical demand.

Andrew Freeman, chairman of North Dakota's Economic Development Commission is heading a new committee to study methods of utilizing the state's lignite resources.

The committee will aim its study mainly at possible uses of lignite in chemical manufacturing and in production of power and heat. A lignite forum last May in Grand Forks aroused extensive interest among power-consuming industries in the use of lignite.

Associations

Members of the Pocahontas Operators Assn. and the Winding Gulf Operators Assn. have joined to form the Smokeless Operators Assn., effective Oct. 1, "or soon thereafter."

The main office will be located in Bluefield, W. Va., with a branch office in Beckley. B. B. Housman is secretary of the new group and H. M. Scott and J. B. Wooldridge are labor commissioners in the new association.

Three new directors have been elected to the board of Appalachian Coals, Inc.

The new directors are: C. W. Clayton, vice-president, Consolidation Coal Co.; V. M. Johnston, executive vice-president, Appalachian Coals; and Goodwyn Holmes, vice-president, Appalachian Coals.

New Books

Explosives

Mining Explosives, by R. McAdam and R. Westwater is writtten primarily as a textbook for mining students and a concise reference book for shotfirers and production officials in British mining and quarrying industries. Material is arranged so the reader may first become acquainted with characteristics of the various types of explosives and then proceed to detailed applications. *187 pp. 6x9-in; cloth. 21/ (approx. $3.), Oliver and Boyd, 39a Welbeck St., W. 1, London, England.*

Welding

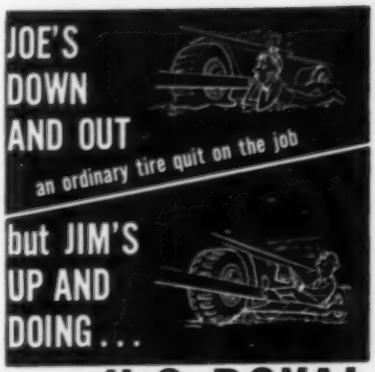
Welding Handbook, Section II provides the latest information on gas, arc and resistance welding processes. Each chapter is written by acknowledged experts in the field. The entire welding industry has cooperated and information has been made available which previously was reserved for company personnel. *$9, American Welding Society, 33 W. 39th St., New York 18, N. Y.*

Water Resources

Your Most Important Raw Material, by E. P. Partridge discusses the importance of industrial water to our national well being. The author notes that as a nation we have a plentiful supply, but it is not as well distributed as we should like. He also answers questions on how much water we need, resources, what we are doing with water in industry and what problems remain in using it economically. *27 pp. 6x9-in; paper. American Society for Testing Materials, 1916 Race St., Philadelphia 3, Pa.*

Auxiliary Ventilation

Auxiliary Ventilation of Continuous Miner Places, by R. W. Stahl describes Bureau of Mines test with auxiliary fans to prevent dangerous accumulations of explosive gas at the face in coal mines using continuous miners. Tests were conducted in several mines in cooperation with the Joint Industry Safety Committee, West Virginia Department of Mines, Pennsylvania Department of Mines & Mineral Industries, equipment manufacturers and mine operators. *R. I. 5414, Publications-Distribution Section, Bureau of Mines, 4800 Forbes Ave., Pittsburgh 13, Pa.*



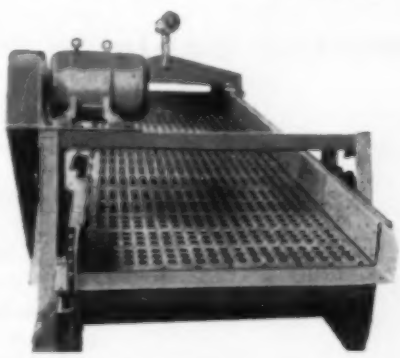
with U.S. ROYAL Mine Cushion TIRES

YOU SHOULD KNOW these great U. S. Royals have moved *millions* of tons with *no* downtime due to tire failure. Yet they cost no more. Write J. A. Watson, Mgr., Industrial Tires *now!*



United States Rubber

Rockefeller Center, New York 20, N. Y.



Here's the plate that takes the pounding

Hendrick H Quality Steel Plate Screens Coal Easier, Faster, Lasts Longer

Hendrick H Quality Steel Perforated Plate, made from heat-treated high carbon or stainless steel, are your best replacements. This carefully-developed metal is tough and rugged under continuous and heavy use. It screens coal easier and faster, while full clearance reduces downtime due to blinding. Product uniformity is assured throughout the life of the screen.

Order Hendrick H Quality Steel with either flat, corrugated, or stepped surfaces, in any desired shape and with any size of perforation. Whatever you order, you get Perforated Plate which reflects Hendrick's 82 years of experience in selecting the kind of steel the mining industry needs.

Hendrick MANUFACTURING COMPANY

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Perforated Metal • Perforated Metal Screens • Wedge-Slot Screens • Hendrick Wedge Wire Screens • Architectural Grilles • Mitco Open Steel Flooring • Shur-Site Treads • Armorgrids • Hydro Dehazers • Distillation Column Internals

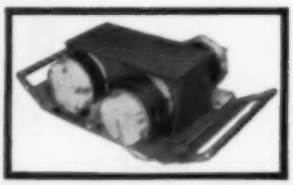


new, Safe, plug-in convenience

for portable cable to 7500 volts

PLM Cable Couplers help put higher voltage a-c power to work easily, efficiently, *safely*. Designed especially for use in open-pit and deep-mining operations, they give plug-in convenience for connecting portable cable up to 7500 volts, to electric shovels, portable substations or other applications.

Coupler consists of plug and socket, with contacts mounted in single-piece, pressure-molded insulators and housed in heavy cast aluminum housings. Safety features protect personnel and equipment. Optional mechanical and electrical features meet complete range of requirements. Rating, 300 amperes, 7500 volts, grounded neutral. Write today for descriptive bulletin 375. PLM Products, Inc., 3881 West 150th St., Cleveland 11, Ohio.



3-WAY COUPLER ASSEMBLY
Two, three or four-way assemblies of PLM Cable Coupler plugs or sockets give added plug-in convenience.

SAFE
no exposed connections

SAFE
electrical and key-type interlocks guard circuit

SAFE
contacts always made or broken within housing

CABLE FITTINGS · TERMINATORS · SPLICING KITS

CABLE PLM COUPLERS

Patents (*from p 48*)

or disintegrating cuttings packed in the cutter bar channel beneath the chain, and for conveying such cuttings along the channel to a suitable point of discharge. No. 2,851,261.

Pulverized fuel gasifier using exhaust of steam powered pulverizer as fuel carrier medium, T. S. Sprague (assigned to The Babcock & Wilcox Co., New York, N. Y.), Sept. 9, 1958. Method of gasifying pulverized coal by reaction thereof with steam and a gas containing free oxygen. No. 2,851,346

Process for the manufacture of coal-tar pitch, A. A. Raineau (assigned to Charbonnages de France, Paris, France), Sept. 9, 1958. Method of obtaining a high yield of coal-tar pitch in proportion to the amount of coal treated. The coal is distilled in a bed strongly fluidized by a rapidly moving current of nitrogen or other gas, at a low temperature, for example 500 to 600 C. A high yield, for instance about 20%, of a heavy coal-tar, rich in pitch, is obtained. No. 2,851,397.

Patents granted in November 1941 are just now expiring, and warrant immediate re-evaluation in the light of current conditions. Among the interesting patents issued in November 1941 are the following:

Process and mechanism for separating intermixed divided materials, R. Peale and R. Peale Jr., Nov. 4, 1941. Design for a pneumatic-stratification mechanism for separating coal, especially fine coal, from impurities. Direction and force of air currents passing through the bed are controlled so that the finer particles are not displaced upwardly nor blown towards or out of the top of the bed. Nos. 2,261,277-8.

Mine car securing device, E. B. McNeer and E. B. Wagner, Nov. 18, 1941. Design for a simple and inexpensive chain latch mechanism for securing a mine car against movement when it is necessary for the car to be stopped on a slope or grade. A chain of correct length couples a rail-engaging clamp with a hook that fits over a forward edge of the car body. The device can be quickly attached and detached. No. 2,263,392.

Explosive, C. S. Hallett, Nov. 18, 1941. An explosive composition particularly suitable for use in coal mines consists of a mixture of potassium perchlorate, coal tar pitch, sugar, potassium bichromate, and sodium chloride. This composition explodes by detonation, is practically flameless, contains a substantial proportion of cooling salts, and is moderate in its action. No. 2,263,406.

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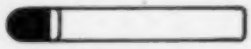
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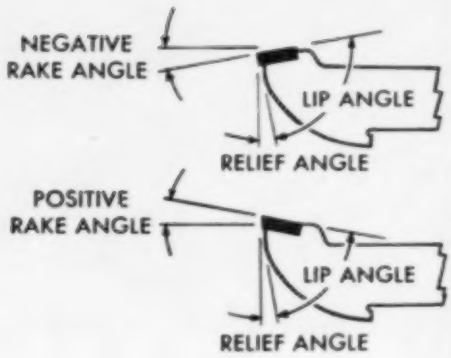
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Comparison of positive and negative rake bits shows the larger lip angle of the negative rake bit which gives greater cutting edge support.

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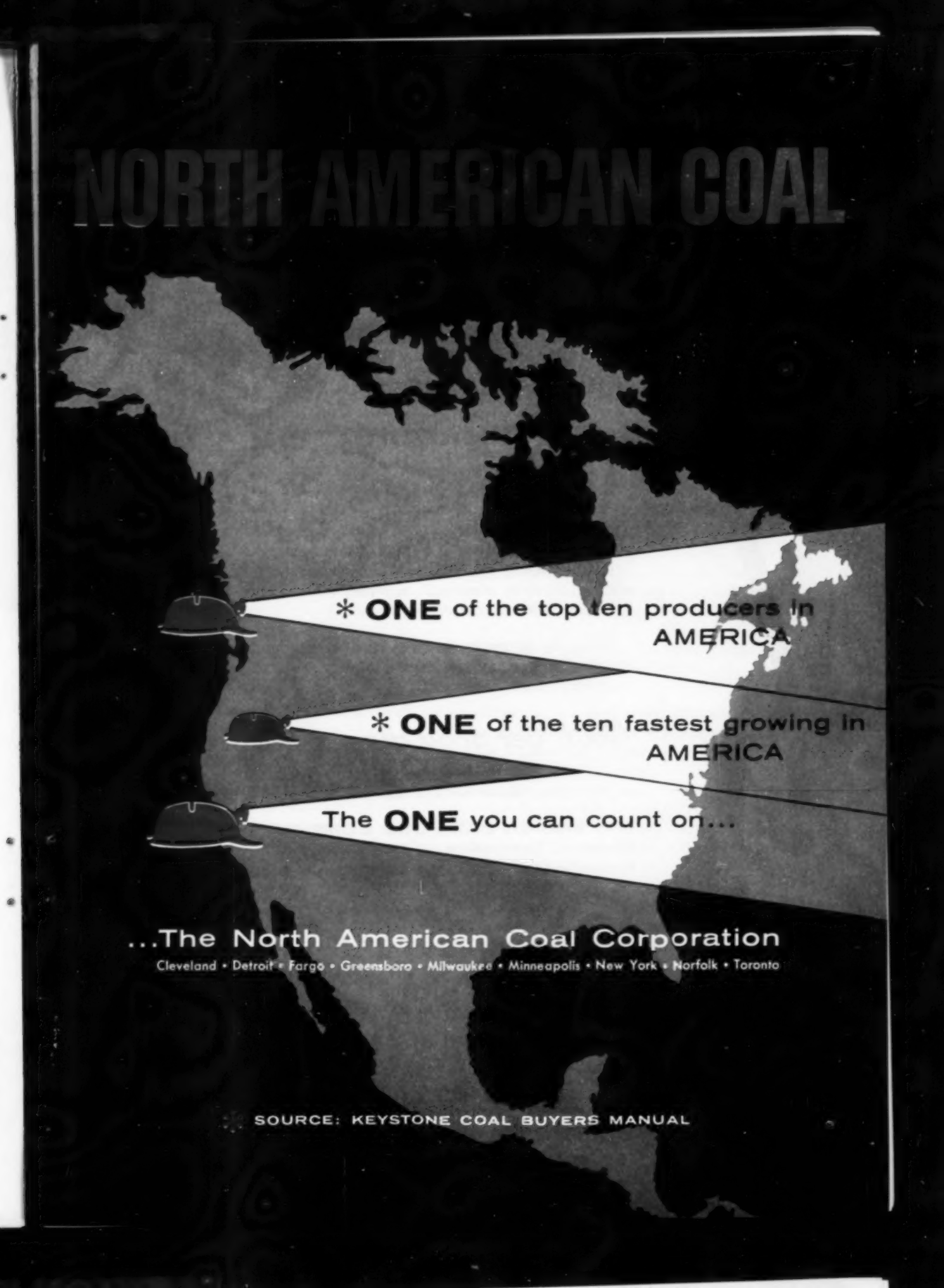
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You can get delivery *now* on this new CC-8 bit from your local Authorized Carboloy Mining Tool Distributor.

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Reinforced Primacord Branch Line — recommended for deep holes where normal strength and resistance to abrasion and cutting are needed. Textile reinforced (yellow with red thread), tough, resilient, flexible. Tensile strength 160 lbs. 1000-ft spool weighs 19 lbs. The knot shown is the double-wrap half hitch, made in the branch line and drawn tightly around the trunk line.



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Plain Primacord Trunk Line — used also for shallow holes — wherever resistance to abrasion and cutting is not required. Textile covered, flexible, resilient, with a "rocky," non-slip surface. Tensile strength 125 lbs. 1000-ft. spool weighs 16 lbs.

P-c

Devoted to the Operating, Technical and Business Problems of the Coal-Mining Industry

COAL AGE

OCTOBER, 1958

IVAN A. GIVEN, EDITOR

Modernization—Progress Key

Continuous updating of plant, equipment, methods and—even—management philosophy and approach, though not the sole criterion, still is a very vital factor in progress and profits in all industry. Modernization therefore remains one of the major keys to economic health. This is the reason for McGraw-Hill's emphasis on updating management, plant, equipment and methods in all the industries served by its publications through special modernization issues in October and November. *Coal Age's* contribution makes up the feature section of this—the October—issue.

A willingness to spend money to make money through lower costs, higher quality and greater safety is the basic ingredient in the modernization approach. The key to wisdom in modernization expenditures is thorough, continuing study and comparison of the results with present equipment with those possible with available new equipment. This presupposes that present equipment is being used at maximum capacity with a minimum of labor which is one reason for including management approach and methods among the objectives in modernization.

Modernization opportunities exist in all phases of mining, preparation, safety and supporting services. From the cost standpoint measures aimed at maximum output with minimum manpower usually pay off the best. The expenditure may be direct, as for a new higher-capacity machine, or they may be indirect, as for improved maintenance facilities or haulage equipment which not only help the face units but result in economies on their own accounts. Obsolescence becomes a major factor, especially when design improvements come fast, since a new unit may yield benefits making it well worth while to replace an old one even though it still is serviceable.

Assuming wisdom in expenditures, the modernization payoff is well worth the price in all mining activities, as the case histories in the feature pages of this issue unquestionably demonstrate, in addition to showing the wide variety of opportunities that exist. They include such items as a cut of 25% in mining cost in less than three years through the industrial engineering approach to cost control, and a cut of 33% in haulage cost as a result of replacing old small cars with big new 262-cu ft units.

Modernization has been one of coal's most helpful tools in the past, and is one of the big reasons why coal has progressed to its present position. Now the shifting tide of energy use favors coal and will favor it more and more in the future, provided coal does its part to give the user, higher and higher quality at minimum cost. Modernization will continue to be the answer.

PLAN '59

How Modern Is American Industry?

A Report by the McGraw-Hill Department of Economics

THE U.S.A. is starting a new period of economic growth, as we leave behind the recession of 1958. This new period presents a challenge to the nation, to the business community and above all to the individual company – to grow *at a profit.*

By now it is clear that growth is the normal way of life for the U.S. Economy. Since 1947, our national product has been growing at a rate of 3.7% a year. And no recession, even the latest and most publicized, has interrupted the trend for long. Now the economy is growing again.

But the conditions of growth are far different from those that prevailed in the years 1947 to 1957.

Today growth in the economy does not mean pressure on capacity, for most industrial firms. It does not mean easy profits. Rather, this is growth under highly competitive conditions, with profits dependent on a firm's ability to hold down costs. **Is our plant and equipment modern enough to do the job?**

A New Survey

To find the answers to this question, the McGraw-Hill Department of Economics has just completed a special survey of business needs for modernization. **The survey shows that it would cost $95 billion to replace today's obsolete equipment.** And this is a priority job, if business is to get costs down for the years ahead.

This tremendous need for modernization presents a challenge to the U.S.A. as a nation. The Communist powers are making a strong and disciplined effort to demonstrate that they can out-produce us – that they can "plow us under" in a contest of industrial strength.

It is a challenge to American business. Our people expect a continuously rising standard of living. Our workers expect wage increases. And often their demands mean price inflation – unless we can achieve sharp gains in output. The public demands higher national income without inflation. This is the challenge to business as a whole.

It is a challenge to the individual firm. Growth in the economy no longer means an automatic rise in sales and profits for any particular company. There are no shortages; industrial capacity is ample. So to participate in growth, the individual firm must achieve better quality or lower costs than its competitors. Otherwise, there will be no profit in growth and no success story for the company.

Is business prepared today for these challenges? The answer, from our study, is clearly "No". The production and distribution facilities of the U.S.A. are not efficient enough to ensure our continuing superiority over the Communist world, to match every wage increase with higher productivity, to do business in a competitive economy at satisfactory profit to the individual firm.

This statement sounds shocking at a time when much industrial capacity is idle and the recession just behind us is being blamed on a surplus of capital goods. But the facts speak for themselves. Here is the record on the past decade of investment in new plant and equipment, and here is our new study of the job that still remains to be done.

THE MODERNIZATION JOB AHEAD: $95 BILLION

The McGraw-Hill Department of Economics asked a wide sample of manufacturing companies, and experts in other industries, "What would be the cost to replace all obsolete facilities with the best new plant and equipment?" Here is a summary of the estimates. (Details on next page.)

MANUFACTURING AND MINING	$34.3 Billion
PETROLEUM INDUSTRY	5.3
TRANSPORTATION AND COMMUNICATIONS	18.4
ELECTRIC AND GAS UTILITIES	12.0
FINANCE, TRADE AND SERVICES	25.0
TOTAL: ALL BUSINESS	$95.0 Billion

Decade of Expansion[1]

Since 1947, private business in the U.S.A. has invested $291 billion in new plant and equipment. Our manufacturing capacity has increased about 80%; electric power capacity, 145%; capacity for basic raw mate-

[1] Figures on "Decade of Expansion" are for the years 1947-1957 inclusive, except where specific reference is made to preliminary data for 1958.

THE McGRAW-HILL SURVEY OF MODERNIZATION NEEDS

Conducted by the McGraw-Hill Department of Economics in August, 1958

INDUSTRY:	AGE OF MANUFACTURING CAPACITY Percent Installed: Prior to Dec. 1945	Dec. 1945 to Dec. 1950	Dec. 1950 to Dec. 1957	COST TO REPLACE OBSOLETE FACILITIES: Millions of $
Iron and Steel	47%	16%	37%	2,855
Nonferrous Metals	47	13	40	1,022
Machinery	41	21	38	3,224
Electrical Machinery	34	18	48	1,917
Autos, Trucks and Parts	42	11	47	2,204
Transportation Equipment (aircraft, ships, railroad equipment)	59	9	32	854
Other Metalworking	54	17	29	2,351
Chemicals	30	23	47	3,070
Paper and Pulp	49	17	34	2,655
Rubber	46	9	45	600
Stone, Clay and Glass	46	20	34	1,840
Petroleum Refining	45	26	29	1,499
Food and Beverages	58	19	23	3,443
Textiles	59	18	23	1,001
Misc. Manufacturing	51	21	28	6,236
ALL MANUFACTURING[1]	48	19	33	34,771

[1] Includes petroleum refinery companies listed under "petroleum industry" in previous table.

rials, by 55%. The distribution and service industries have increased floor space by roughly 50% in the decade. In 1957 alone, business spent $37 billion on new plants and equipment – more than the combined expenditure in all of Western Europe plus Canada.

But all of this expenditure has not made our facilities as modern as supposed, or as modern as we need. Of the $291 billion invested by business since 1947, roughly $157 billion has been for expansion of capacity. Only $134 billion has been spent to replace old facilities with better, more modern equipment. And in recent years, this investment has not purchased as much new equipment as the dollar figures suggest, because prices of capital goods have climbed.

Our postwar capital investment has repaired the worst of the obsolescence accumulated during the depression and war years. But huge amounts of old equipment are still in use, as shown by the table above. This is based on a survey of the age of manufacturing capacity in several hundred companies, representing all of the major manufacturing industries. Almost 50% of our present capacity was installed before or during World War II. More than 65% was installed before Korea. Expert studies of the major non-manufacturing industries show that the age of equipment, in those industries, is even greater.

Thus, of all business plant and equipment, less than one-third is modern in the sense of "new" since 1950; two-thirds is pre-Korea.

This over-all figure is confirmed by a check on specific industries:

- Nearly two-thirds of our metalworking equipment was installed over 10 years ago, according to preliminary results of AMERICAN MACHINIST'S 1958 census.
- Over 65% of the freight cars on our railroads are more than 10 years old.
- Less than half the capacity to process chemicals, rubber or petroleum is new since 1950 – a period that has seen rapid development in such equipment as automatic controls for these process industries.

These examples take on a dollars-and-cents meaning when we recognize that the latest machine tools are about 40% more productive than 1948 models, and that a combination of new freight cars and modern freight yard equipment can reduce operating costs up to 50%. New instruments, that automatically direct the flow of a chemical (or other raw material) process, can often reduce processing costs enough to pay back the cost of the instruments in one year. These savings cannot be made in older plants. By using obsolete facilities, our industries accept a waste in labor and materials that totals many billions of dollars per year.

Why Productivity Must Rise

The U.S.A. can ill afford this waste. In the economic struggle between the free world and Communist world, our margin of superiority depends on the efficiency of our productive facilities.

For the growth of our own economy, we shall need a sharp rise in productive efficiency. During the next ten years, American business must provide the goods and services required for a population that will increase by 32 million. And the increased population will expect higher living standards. Furthermore, the population in ten years will include a higher proportion of dependent persons – children and retired people – and a smaller proportion of working age men. Thus, with a relatively smaller labor force, industry must provide more goods for more consumers.

At the same time, industry must strive to hold the line against rising costs. In an economy with a tight

labor supply, we cannot count on restraint in wage demands, however desirable such a development might be. In the past ten years, hourly wage rates have increased over 5% per year, nearly twice as fast as output per manhour. And this disparity may well continue – causing still more inflation–unless we make more rapid gains in productivity.

We can make these rapid gains – if industry goes all out to modernize its equipment. Output per manhour (in manufacturing) has increased only 2.5% per year since 1951. But this compares with gains of 4% a year in 1947-1950, and over 5% in the 1920s. Today the machines and techniques are available for us to equal, or exceed, these records – to raise output per manhour at least 5% per year. This is a job that can, and indeed must be done, to assure growth in the economy without inflation.

The Job Ahead

The dimensions of this opportunity are shown by the table on the previous page. In its survey on the need for modernization, the McGraw-Hill Department of Economics asked a wide sample of manufacturing companies how much it would cost to replace *all* their out-dated facilities with the best new equipment available. The Department also interviewed experts in each of the nonmanufacturing industries, to find answers to this question. The answers add up to a staggering bill for new plant and equipment.

Modernization of over-age facilities – replacing only what is really obsolete, by today's production standards – would require a total capital investment of $95 billion, or nearly $20 billion per year for the next 5 years.

Furthermore, new production techniques will soon make *today's* plants obsolete, in many cases. Thus, to keep pace with technical advance *from 1958 on*, will require continuing expenditures of $8 to $10 billion per year for modernization.[1]

The total expenditure to wipe out the backlog of obsolete facilities, and keep up with continuing technical advance between now and 1963, would be at least $135 billion.

The U.S.A. has never spent such a sum on the modernization of industrial facilities. Capital expenditures of boom dimension have, in the past, been associated only with the urgent expansion of capacity. **Some forecasters are now saying that because industrial capacity is adequate, the next few years will be a period of low capital investment. The figures above make clear that this would be a national calamity.** The opportunity is there–and the challenge–to invest record amounts of capital in the modernization of plant and equipment.

A National Problem

This also is a challenge to the U.S.A. as a nation. For 100 years, this nation has been looked to as the model of economic development by the rest of the world. For the first time, we face a serious challenge by another nation and another economic system that claims to be better. In a carefully documented 111 page study released in May, the U.S. State Department declared that "the most serious threat" to the U.S.A. today is the drive for economic supremacy by the Soviet Union.[2] Although a much smaller nation industrially than the U.S.A., the U.S.S.R. is today increasing its national output at a rate of 7% per year and its output per manhour by 4% per year.

The U.S.A. does not have to match these specific figures, which represent the results of forced labor in a country just starting to develop industrially. In the contest to win uncommitted nations, the statistics are not likely to be quoted exactly, in any case. But our over-all growth in national output and living standards must be so impressive as to leave no question of superiority. Our factories must be showplaces of modernization to the foreign visitor that will leave him unable to say "I saw much better" in Britain, or West Germany, or Russia.

This is the challenge to the nation –a political challenge to be sure. But it coincides with the challenge to the business community and the individual firm. And the way to meet it is the same: by thorough and rapid modernization of our plant and equipment – not by the slow and steady pace of recent years, but at an accelerated rate that reflects the greater pressure for output at lower cost.

Obstacles To Be Overcome

We must face up to the fact that real obstacles – both technical and financial–stand in the way of faster modernization. Some companies do not have the technical "know-how" required for the latest production techniques. Many more lack the financial resources. How can we overcome such obstacles, and speed up the replacement of old facilities?

In the course of its study, the Department of Economics obtained comments on these questions from many executives. One of the problems, as we noted above, has been the urgent pressure to expand capacity during most of the postwar period. In giving their attention to this problem, companies have sometimes overlooked the chance to modernize older plants.

In some cases, equipment has been kept in place because it was satisfactory, and the users were not aware of still newer designs. Some equipment users believe that equipment makers are not sufficiently aggressive in designing and demonstrating new models.

The biggest obstacle – and one that presents a persistent problem – is the shortage of funds in many companies that need and want to modernize. For all corporations, the cash flow from retained earnings and depreciation has increased by more than $5 billion from 1953 to 1958. But a number of key indus-

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[1] This estimate is based on technical developments reported by McGraw-Hill editors and current price trends for capital goods. It is consistent with the plans for modernization expenditures in 1958-61 reported by companies in a McGraw-Hill survey conducted in April, 1958.

[2] "The Sino-Soviet Economic Offensive in the Less Developed Countries" – U.S. Department of State, May, 1958.

MODERNIZATION PAYS

Profits on modernization—like all business profits—have come down since 1955. However, modernization, in contrast to new capacity, still offers a relatively quick return on investment. Here are companies' answers to the question: "In cases where you are actually replacing old facilities with new plant and equipment in 1958—how soon do you expect these replacement expenditures to pay off?"

	PERCENT OF COMPANIES ANSWERING			
INDUSTRY:	1 to 2 yrs.	3 to 5 yrs.	6 to 8 yrs.	9 yrs. and over
Iron and Steel	11%	56%	11%	22%
Nonferrous Metals	29	71	0	0
Machinery	12	56	12	20
Electrical Machinery	29	57	7	7
Autos, Trucks and Parts	40	60	0	0
Transportation Equipment (aircraft, ships, railroad equipment)	7	53	20	20
Other Metalworking	38	33	10	19
Chemicals	10	53	21	16
Paper and Pulp	22	22	22	34
Rubber	33	33	34	0
Stone, Clay and Glass	0	57	36	7
Petroleum Refining	16	50	17	17
Food and Beverages	16	44	12	28
Textiles	37	47	5	11
Misc. Manufacturing	9	52	13	26
ALL MANUFACTURING*	18	50	14	18

**Note:* Answers to a similar question, in a 1955 McGraw-Hill survey, were as follows: 1-2 years: 17%, 3-5 years: 64%, 6-8 years: 11%, 9 years or more: 8%.

tries have failed to keep pace with the general trend. **These include some of the areas where the need for modernization is most urgent: the railroads, large sections of the textile industry, some mining industries and many small to medium-size companies in manufacturing generally.** The problem of these industries and companies has grown more acute in 1958—since their profits have declined much more than the average for all business.

Any plan to step up the pace of modernization generally must deal with the special situation in these problem areas. Depressed industries and companies need outside help, if they are to modernize. Such help would include a stronger flow of technical information and advice (and occasionally, venture capital) from the more prosperous, inventive industries—as well as advice from equipment suppliers and distributors, industrial publishers and consultants. There is also a public responsibility to help in the problem areas—not with handouts of government money, but with technical assistance and help in finding private capital (like the efforts now being pursued by the Small Business Administration).

Certainly we should lose no time in reforming those provisions of the federal tax laws that now impede investment in modern equipment by hard-pressed firms—especially the outmoded and unfair restrictions on rates of depreciation for tax purposes. At present, the tax regulations require that depreciation be computed over relatively long periods of "useful life" for most types of equipment. And this is a primary reason for the lag in modernization. Machinery generally becomes obsolete long before the expiration of its "useful life" as specified in tax regulations. But it is difficult for companies—especially small companies—to set aside cash for rapid replacement, unless the full amount to be set aside is exempt from income tax. Canada and most European nations allow more rapid depreciation for tax purposes than does the United States.

A combination of self-help with technical help, and a fair break from the tax laws, would do much to reverse the spreading tide of obsolescence in depressed industries, and in many small companies.

PLAN '59

It is this combination that McGraw-Hill advocates as "PLAN '59", to help business modernize *now* for growth and profits. This is what it will take to make a start in 1959 on the $95 billion job of modernization, disclosed by the study we have just completed:

1. A better flow of technical information on where and how to modernize business plants and equipment.

2. Careful review by the individual company of its own opportunities to modernize at a profit—then action to replace obsolete facilities.

3. Reform of the tax laws, to allow more realistic deductions for depreciation, and permit more companies to finance adequate modernization programs from this source of funds.

Much of this program is already underway. The 34 McGraw-Hill Publications, and many suppliers and distributors of industrial equipment, have stepped up their information programs to start the modernization drive. Preliminary plans of manufacturing companies show a strong emphasis on capital spending for this purpose. In August, Congress passed a bill providing limited tax relief for small business.

But the real task of modernization still lies ahead. It is the greatest challenge, and the greatest opportunity, confronting American business as we move forward into 1939.



HENRY G. SCHMIDT,
president



FRANK E. WHITAKER,
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Modern Management Methods Pace North American Growth

NACCO experience shows how wise investment today insures profits tomorrow

THE FACT that the North American Coal Corp. is one of the fastest-growing producers in America is evidenced in many ways, both physical and financial. On the physical side, among other things, a new wing is now being added to one of the industry's most modern office buildings to meet the requirements of its rapidly developing management personnel.

Annual output of the company's mines has increased to over 6 million tons per year and is backed by reserves totaling well over 400 million tons.

This growth to the ninth largest commercial producer has required the expenditure of over $35 million for property modernization and expansion during the last 16 yr.

And in North American's four-state operational area 10 mines use 30 new continuous miners, producing over 40% of its output.

Goal in North American's capital-spending program has been to acquire and modernize properties which offer the greatest potentials for reducing costs, increasing productivity and boosting profits.

Achievement of the goal is indicated by the firm's operating and financial data. From 1942 through 1957 the company, without interruption, has posted annual net incomes totaling $18,575,000. Dividend payments have totaled $5,108,000.

Working capital has increased from $1,427,000 to $10,024,000.

Equity per share of common stock (value in terms of net worth) has risen every year, from $3.59 to $16.25.

Continuing growth of the company is supported by an active research program and additional capital expenditures for coal preparation. Developments in the extraction of alumina from low grade ores and coal mine wastes offer promise of tremendous growth and important diversification. Yet all research is directly related to the successful production and marketing of coal. Capital expenditures under way in West Virginia, to assure the production of carefully controlled, uniformly prepared premium coals, will total $3 million in the next 2 yr.

North American's rise to prominence as the ninth largest commercial producer of bituminous coal reflects no magic or miracles. Rather the experience shows how careful, long-range management planning can integrate all phases of production and marketing to serve total company growth. This means:

Acquiring properties and introducing equipment which have the greatest cost-reducing and profits-producing potentials.

Coordinating sales development with mine and market locations.

Building a strong reserves position.

Reducing mine-to-market costs.

Expanding working capital.

Improving personnel performance.

Developing new and improved products.

Implementing the broad concept of public relations.

The following pages present the highlights of how North American has done the job.

Modernizing Properties

The job of modernizing and expanding NACCO properties accelerated when Henry G. Schmidt assumed the presidency in July, 1942. In the 1949 annual report to stockholders, he stated:

"In July, 1942, the present officers took over the management of your properties. They found among other things that the physical condition of your company was deplorable at practically all of its mines. It was essential, therefore, that the properties be modernized and production capacity increased . . ."

Under new leadership the firm has invested $35 million in additions to property, plant and equipment.

To insure profitable growth, management guided its mine modernization effort to acquire properties and introduce mining, haulage and processing equipment that would afford maximum opportunity to reduce costs, increase productivity, and boost profits.

Highlighting the effort were these developments:

Powhatan No. 1 Mine acquired the Gaddis Tract containing 75 million tons of recoverable coal. Powhatan No. 3 Mine, with reserves totaling over 100 million tons of coal, was purchased from the Rail & River Coal Co., a subsidiary of Canadian National Rys.

At Powhatan deep mines the company installed 13-ton mine cars and a new rotary dump in No. 1 mine, and added Hydroseparator equipment and drycleaning tables. Numerous improvements in river-transport facilities were effected, including construction of a 2,200 ft conveyor from the tipple at No. 3 mine to the Ohio River and purchase of a river fleet.

Higher capacity stripping equipment featured improvements at the Betsy and Fulton mines. At Betsy, one of the largest draglines in the world equipped with a 200-ft boom and 30 cu yd bucket brought mounting production.

Modern preparation plants were built and the Mead, Red Parrot and Red Cedar mines were completely mechanized. Red Parrot also acquired several million tons of premium coal reserves through an additional land-lease from the Federal Coal Co.

Since 1954 Mr. Roy W. Fox, vice president–production, has guided mine modernization. His attention has been focused on the introduction of continuous miners wherever suitable.

Management Modernization

☐ Tailor the organization to the specific operation; provide coverage of the necessary job functions, both staff and line (engineering, supervision, etc.); clearly allocate responsibility from top to bottom; grant authority commensurate with responsibility in each instance.

☐ Consider a recruiting and employment program, including modern testing and selecting methods, that will insure getting the best-possible men, both officials and miners.

☐ Establish or contract for a training and upgrading system for both management and, as necessary, men to increase skills and knowledge and get better managers, supervisors, mechanics and electricians, and machine operators.

☐ Use industrial-engineering principles to revise methods and equipment for maximum efficiency and safety, and minimum cost.

☐ Insure the necessary product quality by continuous modernization of the preparation facilities.

☐ Consider an incentive plan to insure the extra effort that results in lowest cost with maximum quality and safety.

☐ Coordinate sales planning and mine output to meet present and future market needs in such ways as these: prospect for and develop properties near markets; concentrate on markets with the greatest potentials for the types of coals produced; seek the long-range stability in sales that permits necessary investment in cost-reducing machinery and equipment.

☐ Integrate all phases of company operation to serve total growth of production and sales by: expanding working capital, improving mine-to-market transportation facilities, maintaining strength in coal reserves, providing for future personnel needs, developing new and improved products and participating in industry-wide promotion and public-relations activities.

Thirty units with collateral equipment have been installed: 17 at Powhatan deep mines, 6 at Conemaugh mine, 5 at Mead mines, and 2 at the Betsy strip mine.

With these installations NACCO's continuous mining tonnage has grown from scratch to 42% of total production in the first 6 mo of 1958. President Henry G. Schmidt states: "The use of continuous miners and other developments, introduced by Mr. Fox, has done more to increase productivity than any other improvements heretofore made."

A pioneering event has been the successful application of continuous mining to parts of the Betsy strip property. Overburden in "islands and fingers" was considered too high for economical coal recovery by conventional stripping methods. "Our experience demonstrates that coal can be produced here at a cost not to exceed present strip mine costs." The upshot: several million tons of previously unmineable coal have been made available for economical recovery and the life of the Betsy property has been extended 3 to 5 yr.

The major shift to continuous mining has also made its mark at Mead and Conemaugh mines. At Mead, where unusual mining conditions had made it difficult to keep costs competitive for many years, five new Wilcox boring-type miners are pointing the way to increased productivity.

At Conemaugh the entire operation is based on continuous mining. Completed last month was a program to revamp the underground haulage system. Sixty 15-ton mine cars are now in use. A rotary dump to handle the new equipment was installed. The coal is now brought to the surface by a slope conveyor belt.

Planning Sales

Coordination of sales planning with mine production is a vital part of every-well conceived mine modernization program. Mr. Frank E. Whitaker, senior vice president, has coordinated NACCO's four principal lines of action:

1. Explore for and develop properties near to markets.

2. Concentrate on those markets which have the greatest potentials for the types of coal produced.

3. Seek long-term sales outlets which provide the production stability needed to attract capital for expansion and the purchase of cost-reducing machinery and equipment.

4. Maintain modern washing and screening plants to serve the most exacting needs.

NACCO has stressed long-term sales contracts with utilities because of its ability to offer assurances of competitive mine prices, long-term supply and favorable transport costs. Ohio River Valley customers get these advantages through purchases from Powhatan and Betsy mines. The Pennsylvania Electric Co. benefits similarly from output of Conemaugh mine.

Explaining why his company has pushed the long-term sales contract, President Schmidt says:

"My own philosophy on long-term contracts is that the operator is entitled to the increase in labor efficiency that accrues under his management during the term of the agreement. He also should absorb any loss of efficiency . . ."

Although NACCO has enjoyed long-term utility accounts, it has been attentive to the needs of other markets. Recently elected vice president —sales, Mr. William A. Barringer has brought emphasis to the general in-

dustrial market. Modern merchandizing methods will be under his direction.

Red Parrot and Red Cedar have been expanded to serve growing industrial markets in Eastern United States. Powhatan mines are strategically located for sales to chemical and industrial plants now in the Ohio River Valley. Coal from the Mead operation is outstanding as the base for a foundry coke and as a metallurgical coal.

Adding still another string to its bow, the company is actively exploring and developing opportunities in western markets. Most notable so far was the purchase in 1957 of the Indian Head lignite mine near Beulah, North Dakota. Operating as the Dakota Collieries Div., the mine produces lignite for nearby utility and industrial markets. With aluminum companies looking at this area, output at the Indian Head mine may expand in future years. Their preliminary surveys show much interest in setting up plants where low-cost lignite power would be available and a NACCO research project may provide a convenient source of alumina from clay or lignite-mine wastes.

Building Reserves

First consideration in making North American budgets is coal lands. About $500,000 a year is spent on this activity to insure the replacement of each year's depletion. Total proven coal reserves (owned, under lease and optioned) are currently well over 400 million tons.

A strong reserves position, management holds, is vital to modern coal merchandisers seeking permanency and growth in their business. In particular, reserves buildup is basic to the pursuit of long-term utility accounts and the anticipation of increased business in other markets.

In this regard, President Schmidt states, "Fortunately, NACCO's mines are in the heart of the great industrial market of America and its greatest reserves are in the famous Pittsburgh No. 8 seam, located on the Ohio River, below Bellaire, Ohio, on the Ohio side. They are proven reserves which can be mined economically. The development taking place in that area in the aluminum and chemical industries augurs well for the future of our properties."

Although its greatest reserves are in the Ohio Rivery Valley, the company keeps constantly alert to opportunities for expanding reserves of its other properties and for entering new production areas. As noted previously, such opportunities have materialized, for example, in the addition of coal lands to Red Parrot mines in West Virginia, and in the purchase of the Conemaugh property and the Indian Head lignite mine in North Dakota.

Reducing Mine-to-Market Costs

However effective mine modernization programs may be in increasing productivity, much of this gain can be lost by inadequate or high-cost transportation. Consequently, NACCO has persistently stressed water transport and the development of markets near to mines.

In the first 6 mo of 1958, 58% of the tonnage sold was shipped to destination by water or conveyor belt.

The balance of production originated on the C & O, Pittsburgh and West Virginia, Northern Pacific, Pennsylvania, and Virginian railroads.

Expanding Working Capital

NACCO bases its ability to develop working capital on good management, production policies that offer both stability and flexibility, and a consistent record of profitable operation. According to Mr. Paul A. Kleber, vice president—finance, soundness of the philosophy has paid off. Working capital, for example, more than doubled from $4,218,000 on April 30, 1948 to $10,024,000 at year end 1957.

Retained earnings and long-term debt alone financed capital growth until July, 1956. At this time—marking a turning point in its financial history—the company added a new source of capital: the equity market. Offerings involved the sale of 250,000 shares of common stock to the public and 83,000 shares to Incorporated Investors, a high-grade investment company.

Commenting on the public stock issue before the Cleveland Society of Security Analysts, January, 1957, President Schmidt stated:

"These additions to our capital are very significant and important but, if our expansion continues, we will need much more. . . . In regard to future financing, we shall probably use all three sources at our disposal—retained earnings, equity capital and long-term loans."

Latest major financial venture, September, 1957, was selling a $10 million issue of long-term notes to (1) refinance existing debentures and (2) provide $5,550,000 in new money for the purchase of continuous miners and collateral equipment at Powhatan deep mines and for property improvements elsewhere.

Improving Personnel Performance

The primary objectives of NACCO's personnel program are to (1) improve the efficiency of the existing staff, (2) obtain talented people for replacement and expansion, and (3) promote safety.

In efforts to upgrade the efficiency of salaried and supervisory personnel the firm takes into account many factors, including incentives, recognition, job training and a pleasant working environment. Especially notable is its policy stressing maximum pay consistent with job classification, encouraging participation in an extension-course program, providing insurance benefits and offering a combined retirement and profit-sharing plan. A Handbook of Standard Practice Regulations is distributed to keep employees fully informed on company procedures.

Because of the accelerated advance to more complex machinery and better production methods, personnel management has focused much attention on developing a more skilled engineering and mine force. Explaining one move, C. G. Evans, personnel manager, states:

"In the spring of 1956 a forward-looking plan was initiated to bring capable, trained young men into the company. Four scholarships a year are offered to high school graduates: two to sons of our employees and two to the general public. For an immediate start on the plan, we also placed university undergraduates under contract.

"Reaction to the program was so outstanding that in the spring of 1958 over 300 young men applied for our awards . . . of the twenty-four gran-

tees so far in the program, only six men have terminated their agreement; all others are either in school or have taken positions with us."

North American is also expanding its sales force. An intensified "development and sales training program" has been further augmented by combustion and service engineers.

To further the cause of a more skilled working force, management started a comprehensive program of screening new employees on Jan. 1, 1957. Objective here is to spot men of outstanding ability. As a result of investigating the area of personality traits and attitudes, data are being developed which aid in matching individuals to jobs.

The promotion of safety covers a wide variety of activities under Mr. Evans' company-wide supervision. Each mine superintendent is directly responsible for the safety performance of his operation. Safety activities include: mine inspection, training programs and regular meetings between management and foremen, as well as between foremen and their crews. Extension courses in safety are offered to foremen. First-aid teams in Ohio, West Virginia and Pennsylvania participate in their respective state contests. Worth noting: The Powhatan No. 3 mine placed first in 1958 in the first-aid meet held at Columbus, Ohio. This is called the All-Ohio Safety Conference and is sponsored by the Industrial Commission of Ohio —Department of Safety and Hygiene. Also, Red Parrot and Powhatan No. 1 and No. 3 mines were among the first to get USBM 100% accident-training courses.

USBM safety data show that the company's safety record is considerably above the industry average. Several properties have received recognition from the National Safety Council. Much of the record is due to aggressive followup and elimination of hazards whenever and wherever they are found.

Researching for Profit

Progressive companies rely heavily on research today to foster growth in tomorrow's markets. Recognizing this fact, NACCO set up a Research and Development Department late in 1956. The firm named Dr. Robert L. Savage to head up a program, which he defines as follows:

"The prime objectives of North American's research and development program are to find more profitable uses for conventional products and to provide diversification into new products, particularly chemicals. As a start, experimental programs have been undertaken at several excellent industrial-research organizations. Eventually, contract research will be supplemented by a company research facility.

"Other fields of direct interest to the company and under consideration relate to upgrading the coal from certain of our mines, transporting coal by other than conventional methods, and novel uses of powdered coal as a fuel. The production department has completed a project on the application of the Wilcox miner and the development of a suitable mining system for this equipment. Also under investigation are pilot plant studies on the low temperature carbonization of coal and lignite."

High on the current agenda is experimental work on the extraction of alumina from coal-mine wastes. A joint-venture corporation (50% owned by NACCO) has been set up to develop and use the process and pilot plant work has been initiated. NACCO expects to attract aluminum companies to its Ohio Valley and North Dakota properties through offering a combined package of raw material and low-cost power. "This activity is progressing very rapidly," President Schmidt says, "and we are confident that worthwhile results will be achieved."

Selling the Company

A *Coal Age* feature, "Selling Your Company and Your Industry" (March, 1958), gave North American credit for one of the industry's most effective public relations jobs. **Cited in particular were an investor-relations program managed by D. W. Nelson and a program for obtaining new talent, directed by personnel manager, C. G. Evans. These activities are part of a conscious, coordinated effort to promote harmonious relations with all groups (personnel, customers, stockholders, etc.) whose attitudes can directly affect the welfare of the company and the conduct of its business.**

NACCO is among the enlightened companies which practice the universally accepted theory that healthy labor-management relations are indispensable to company and industry prosperity. This year, for example, President Schmidt was asked to serve on the three-member Board of Trustees of the UMWA Welfare & Retirement Fund. He accepted the job—without remuneration—as a duty in the industry's interest and to get better acquainted with labor problems. The firm is on record as being "in complete sympathy with the aims of this Fund." (For a progress report on "The Welfare-Fund Medical Program," see *Coal Age*, March, 1958, p 72.)

In an effort to sell the modern coal industry, the company produced "News from the Coal Country"—a 27 minute 16-mm sound film in full color. The film has been shown about 1,000 times to industrial, civic, school and overseas groups totaling over 340,000 people. Television programs have shown the film to an additional 1,443,000 viewers.

Looking Ahead

Reflecting confidence in North American's future and in its management team, President Schmidt addressing the stockholders recently stated:

"In summation of the entire NACCO picture, I believe that your company is financially secure, that we are in a most excellent competitive position . . . that the company has young and vigorous men in positions of responsibility, that the company is soundly managed, that the earnings trend over the long pull will be gradually upward, and that we are financially able through proper capitalization and good earnings to maintain satisfactory dividends now and in the future.

He added: "Growth and development are continuing. It is gratifying to see the results of our progress and to follow the daily demonstration of our theme:

North American Coal
ONE of the top ten producers in AMERICA
ONE of the ten fastest growing in AMERICA
The ONE you can count on . . ."



open motors for extreme conditions

Save up to 60%!

Here's an amazing advance in motor technology! It's the *Super-Seal* motor line — an open motor design so completely unaffected by moisture, dust, dirt, oil, acids and alkalis that it can be used in many applications previously requiring more costly enclosed motors. *Savings range from 15 to 60%.*

Super-Seal motor superiority results from revolutionary insulating techniques. Available in any integral horsepower size, smaller *Super-Seal* motors incorporate an encapsulated stator. A durable epoxy resin encloses the stator, creating an electrical system impervious to outside elements.

In larger sizes, *Silco-Flex* insulation is used. In this system, silicone rubber is vulcanized into a homogeneous mass to form a flexible, moisture and heat resistant, void-free dielectric barrier around coils and leads.

Both of these insulation systems are unsurpassed. Proof? An encapsulated motor ran for hundreds of hours at full load in a 4% brine solution.

Find out more about new economies in motors from your A-C representative or distributor, or write Allis-Chalmers, General Products Division, Milwaukee 1, Wisconsin. *Silco-Flex and Super-Seal are Allis-Chalmers trademarks.*

ALLIS-CHALMERS A-C

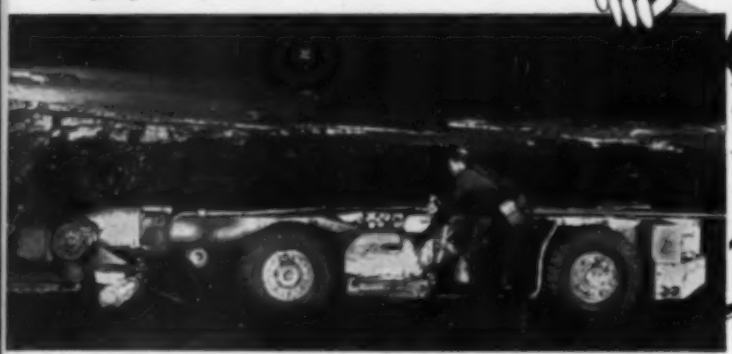
A-5802



you can have an

...with Jeffrey

Alternating current power, with its many operating advantages, can now be employed throughout the electrified mine. All Jeffrey machinery, from cutters at the working face to the main belt carrying coal above ground, can be powered by AC as well as DC.





Universal Cutters *Head and cutter bar can be rotated 360° in either direction for any kind of cut, any place in the seam—a 30-foot horizontal cut or a shearing cut 5' 5" either side of center.*





Roof Drills *For roof bolting to give you increased safety. 140 bolts per shift with the 56 RDR machines . . . some shifts averaging 190 or more 4-foot bolts.*





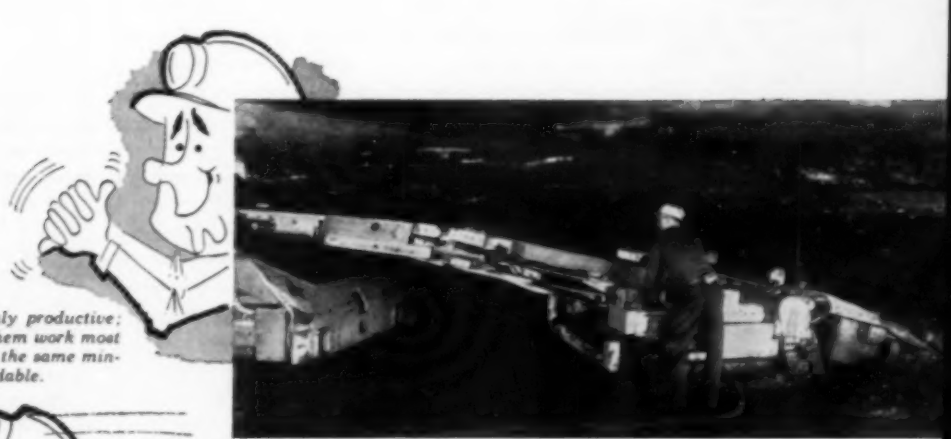
Colmols *For low, medium or high seams, Jeffrey Colmols offer the ultimate in mechanized mining. Coal is broken from the face, not ripped or ground off. You get better overall screen consist, greater speed and efficiency. Withstands the most severe operating conditions.*

CONVEYING • PROCESSING • MINING EQUIPMENT...

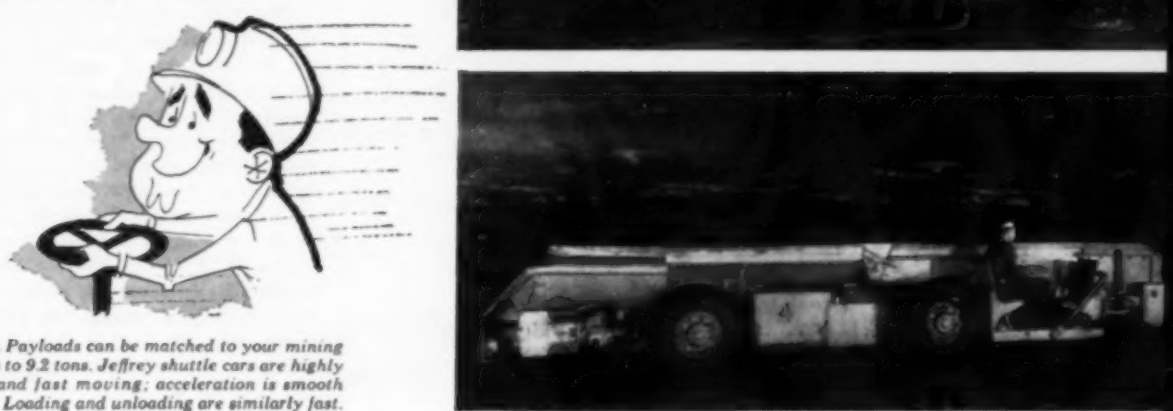
all-AC-powered mine

equipment

Production goes up with Jeffrey machinery in your mine. Maintenance is low. The reason... 80 years of world-wide experience applied to the development of mining and materials-handling equipment.



Loaders *Fast, easily maneuvered, highly productive; flexibility built into Jeffrey loaders lets them work most efficiently with other face equipment and the same mining cycle. Time-tested and proven dependable.*



Shuttle Cars *Payloads can be matched to your mining height: 4.6 tons to 9.2 tons. Jeffrey shuttle cars are highly maneuverable and fast moving; acceleration is smooth and automatic. Loading and unloading are similarly fast.*

Let a Jeffrey engineer show you how to reduce costs with Jeffrey mining machinery and handling equipment. Call our nearest office. The Jeffrey Manufacturing Company, 912 North Fourth Street, Columbus 16, Ohio.

TRANSMISSION MACHINERY...CONTRACT MANUFACTURING

JEFFREY

THE LORADO COAL MINING COMPANY
TIME STUDY OBSERVATION SHEET

SHEET OF

OPERATION: ROTARY ROOF BOLT DRILL OPR
GENERAL DATA: 8-60" BOLTS - (2) 2' X 6" X 16" HEBERS. 4 POSTS PER CUT — BOT. DRY LEVEL - DRILLING CONDITIONS 53" FIRM SHALE 2" SS. + 1" SS. + 2" SS.

STUDY NO. MINE 8
DATE SHIFT 1
SECTION #5
OPERATOR(S)
FOREMAN
OBSERVER STOP: START: 10:10

	ELEMENT	ACT. MIN.	ACT. RATE	NORM. MIN.	REST FACT.	STD. MIN.
	MOVE 90'		100			
	TURN MCH					
	MOVE 30'					
W3	WAIT ON S.C.					
	MOVE 50					
X1	IDLE					
	MOVE TO CONTROLS					
	POS. FOR HOLE					
	POS. HDR					
	PLACE STEEL					
	DRILL #1 HOLE					
	CHANGE STEEL					
	DRILL #1 HOLE					
	PLACE EXTENSION					
	DRILL #1 HOLE					
	REMOVE STEEL					
	PLACE BOLT					
	TIGHTEN BOLT					
	LOWER HEAD					
	RACK HEAD TO NEXT HOLE					
	POS. HEAD					
	TOTAL 5.70					

TIME STUDY OBSERVATION SHEET (above) contains space for noting all data necessary for a complete study of the elements of an operation.

Cost Control

How Lorado Coal, through the industrial-engineering approach, attained modern cost control. Benefits, in addition to increased rewards for management and supervisory personnel, include an increase of 40% in tons per man and a cut of 25% in mining cost in less than 3 yr.

INDUSTRIAL ENGINEERING at the Lorado Coal Mining Co., Lorado, W. Va., provides management, home office and sales department with a tool for measuring production and cost, and for making predictions for future investments and expansions. This tool, plus good management, has made it possible for the company to economically operate a potentially high-cost mine without the purchase of new or additional equipment.

Lorado Coal has successfully practiced industrial engineering for the past 7 yr. During this period both company and supervisory personnel have benefitted—the company by receiving a fair return from its investment in equipment as well as personnel, and supervisory personnel from a unique incentive plan included in the program.

Although many achievements have been made in production and cost control, the company is confident that greater gains will be made by the continued practice of industrial engineering.

Organizing the Program

The original industrial engineering program, initiated in October, 1951, was set up by the management consulting firm of Alfred Remond & Associates. Ted Barry, field representative, worked with management. Later, he organized the consulting firm of Theodore Barry & Associates, of Los Angeles, Calif. Lorado retained the latter firm to audit the program at regular intervals.

As the program took roots Lorado assigned the various jobs involved in carrying on the program to men in its own organization who had the ability to use mathematical and basic engineering techniques, and who could get along with their fellow employees.

The initial program concentrated on production and the first goal was the establishment of standards based on time-studying all phases of the mining cycle. On the basis of these performance measurements, the company revised its methods of mining to maximize loading with a minimum of supporting labor. Benefits were: an increase in production (tons per man-day) of 40% without extensive changes in equipment and a reduction of 25% in mining cost. These results were obtained by June, 1954. The program, as noted, was initiated in October, 1951.

Starting off on the right foot can often be the difference between success or failure of an industrial engineering program. Lorado's first step was to educate all levels of management in the purpose and benefits of industrial engineering. It fully realized that the success of the program depended on management not only accepting it but on each man endeavoring to improve the system and get the most out of it. Officials of the company feel certain that this approach to introducing industrial engineering has been responsible for its acceptance and success.

Time Study and Standards

The job of collecting data and setting standards when a cost control system is adopted by a company requires frequent time study of all phases of the mining cycle. The initial objectives at Lorado Coal were as follows:

1. To use equipment already owned by the company, if possible.

2. To improve the methods used at the face so that maximum loading with a minimum of supporting labor is attained.

The accompanying time-study observation sheet shows how an operation is broken down into the smallest practical elements that can be timed. These time studies of the various operations were conducted over a long period to make certain that representative times were obtained. After sufficient data had been collected, methods were revised and standards and incentive goals were established.

In revising methods and setting standards it was assumed that a machine was 100% efficient when operating under standard conditions. The basis for methods revisions and standards-setting was the assumption that a standard operator was working with a standard machine under standard conditions.

Mode or frequency charts were used to arrive at the normal times required for the various operations. This included the observed time plus a fatigue factor.

Keeping Program Current

After the program was established the job of keeping it up-to-date required considerable attention. John C. Bobella, industrial engineer, is presently in charge of the program. His duties, among other things, are to appraise changes in conditions, forecast weekly production per section and furnish labor and supply budgets monthly.

The weekly appraisal involves three steps:

1. Conduct an inspection of each section.

2. Apply standards to each unit with respect to conditions.

3. Predict the tonnage for each section.

The inspections are conducted each Friday. A section report involves such operations as measuring all coal

Cost-Control Modernization

☐ Organize for attaining low cost through the industrial-engineering approach by securing management acceptance and understanding of basic principles, enlisting the active participation of supervisors, employing or training industrial engineers or their equivalent, and allocating to industrial engineering or cost control the necessary rank and authority.

☐ Time-study operations as necessary.

☐ Revise methods on the basis of time-study results and analysis of both cycle and equipment.

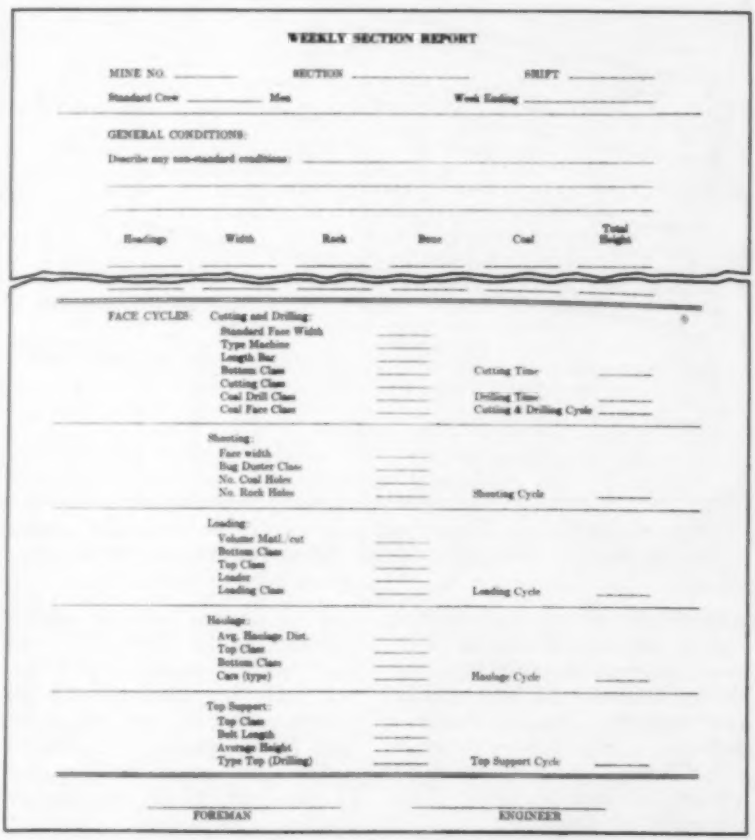
☐ Establish performance standards with the necessary provisions for re-study and revision.

☐ Set up incentive-pay programs for foremen or foremen and men.

☐ Develop production and delay reports providing the desired data for control.

☐ Achieve the final degree of cost control through the adoption of cost and production budgets.

For additional detailed data on the application of industrial engineering principles to control of cost, see the* Coal Age *Mining Guidebook, published in Mid-July, 1958.



WEEKLY SECTION REPORT

MINE NO. _____ SECTION _____ SHIFT _____

Standard Crew _____ Men Week Ending _____

GENERAL CONDITIONS:

Describe any non-standard conditions: _____

Headings	Width	Rock	Bone	Coal	Total Height

FACE CYCLES:

Cutting and Drilling:
- Standard Face Width _____
- Type Machine _____
- Length Bar _____
- Bottom Class _____ — Cutting Time _____
- Cutting Class _____
- Coal Drill Class _____ — Drilling Time _____
- Coal Face Class _____ — Cutting & Drilling Cycle _____

Shooting:
- Face width _____
- Bug Duster Class _____
- No. Coal Holes _____
- No. Rock Holes _____ — Shooting Cycle _____

Loading:
- Volume Matl./cut _____
- Bottom Class _____
- Top Class _____
- Loader _____
- Loading Class _____ — Loading Cycle _____

Haulage:
- Avg. Haulage Dist. _____
- Top Class _____
- Bottom Class _____
- Cars (type) _____ — Haulage Cycle _____

Top Support:
- Top Class _____
- Bolt Length _____
- Average Height _____
- Type Top (Drilling) _____ — Top Support Cycle _____

FOREMAN ENGINEER

SECTION REPORTS are used to appraise each section weekly. Each phase of the operation is analyzed separately.

Date

DAILY SUPPLY COST SUMMARY

Account No.	Budget	C/T Today	C/T M.T.D.	Total Today		Budget	C/T Today	C/T M.T.D.	Total Today
330 Loader Parts					Loader Parts				
331 72 Trunk Parts					72 Trunk Parts				
312 Buggy Parts					Buggy Parts				
313 Elevator Parts					Elev. Parts				
320 Machine Parts					Mach. Parts				
338 Drill Parts					Drill Parts				
338C Air Compressor					Air Compressor				
338A Stoper Parts					Stoper Parts				
360 Loco. Parts					Loco. Parts				
334 Rail Bonds									
290 Oil-Grease									
330 Hoist Parts					Hoist Parts				
332 Welding Supplies					Weld Supp.				
333 Repl. Tools									
350 Equip. Cables					Mine Maint.				
Reserve					Reserve				
Total Mine Maint.					Total Control Shop				
332 Machine Bits					House Repair				
335 Drill Supplies					Town Expense				
336 Explosives					Reserve				
336A Airdox Supp.									
336B Airdox Rental					Total H.R. & E.				
340 Timber Supplies					A. C. Elec. Supp.				
340A Pin Up Supp.					Oil, Lub. Supp.				
340B Pin Up Bolts					Pur. Power				
356 Breather Parts					Miscellaneous				
354 Breather Temp.									
352 Pump Supplies					Total Supply Cost				
354 Rock Dust						1	2	3	4
370 Mine Car Supp.					Timber Supp.				
352 Communications					Pin Up Bolts				
354 Track Acc.					Total				
356 D. C. Power Supp.						5	6	7	8
338 Hoist Ropes					Timber Supp.				
331 Sand					Pin Up Bolts				
333 Tools					Total				
334 Lamp Parts					Authorizations				
Reserve									
Total Mine General									
290 Oil-Grease									
360 Tipple Parts									
345 Coal Treating									
Reserve									
Total Preparation									
320 Trucks									
320A Dozer									
Gas									
Total Outside									

Pay Roll Charges	Daily Issues	Tonnage	
		Daily	To Date

SUPPLY BUDGETS for equipment and mine supplies are determined monthly. They are based on engineering studies of the needs rather than past records.

DAILY

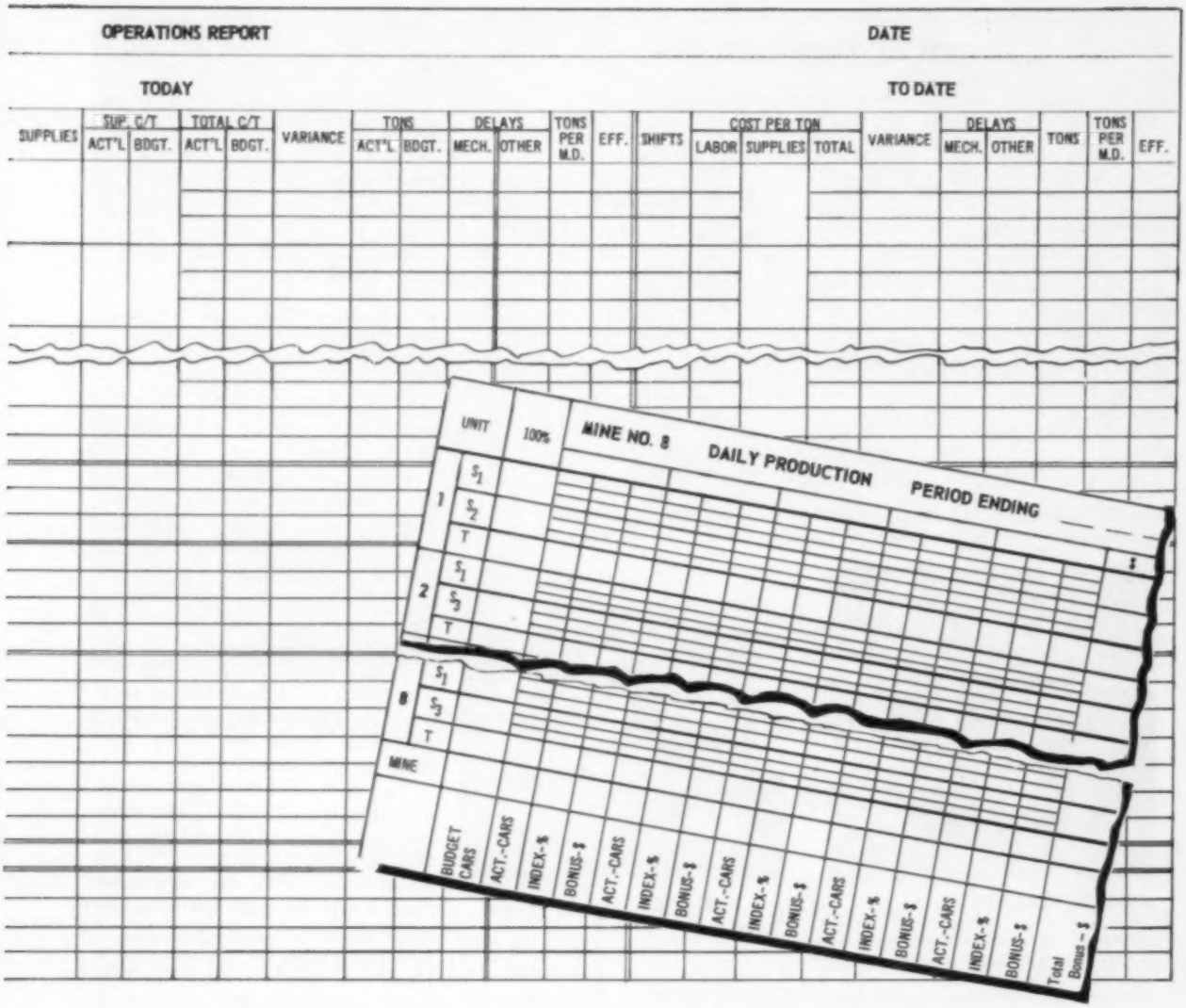
CONTROL CENTER		MEN ACT'L	MEN BDGT.	LABOR	LAB. C/T ACT'L	LAB. C/T BDGT.
1	Day					
	Night					
	Third					
2	Day					
	Night					
	Third					
9	Day					
	Night					
	Third					
TOTAL PRODUCTION						
General Work						
TOTAL MINING						
Mine Maintenance						
Shop						
TOTAL MECHANICAL						
Preparation						
Outside						
Supervision & Engrg.						
Power						
A. C. Electrical						
H. R. & E.						
TOTAL MINE COST						
Last Month						
Authorizations						
Overtime						

DAILY OPERATIONS REPORT includes "today" and "to date" figures so that a comparison can be made. It also helps reduce paper work.

heights and impurities; evaluating cutting, drilling and shooting conditions; determining roof-bolting conditions; observing the loading cycle; and inspecting haulage conditions, including grades, bottom conditions and distances. The form used in the weekly appraisal is shown in an accompanying illustration.

Copies of the report and standards for the oncoming week are distributed to foremen and the resident controller. At the beginning of each week the new standards or production goals are discussed with the foremen so that they will fully understand the appraisal of their particular section. The foremen also are given an opportunity to ask any questions that may occur to them.

Setting weekly production goals does not necessarily mean that they cannot be changed. If conditions change during the week the foreman can request that his section be reappraised. The findings will indicate whether or not the number of loaded cars previously required should be reduced to attain a good unit performance under the prevailing conditions. Production for a unit is expressed in terms of "mine cars loaded." This provides the foremen with a good yardstick for measuring their performance during the shift. The desired standard "mine car volume" was determined by carefully measuring cuts and loading them into cars under good supervision to insure satisfactory loading. The standard



PRODUCTION PERFORMANCE is entered daily and includes car budget, actual cars loaded, percent index and bonus earned.

number of cuts per shift therefore yields a specific number of cars if loaded according to standards.

This reappraisal system also works the other way. In the event conditions improve an increase in the number of cars may be warranted. The system has been valuable in building confidence in the industrial engineering program by giving the section foremen the right to voice his opinion on standards rather than have him feel that he is a victim of arbitrary action.

Production standards based on cars per shift quite naturally carry some rather stiff penalties if cars are not loaded properly. This is understandable since mine performance relies on each having a definite tonnage. The penalties for loading light cars are:

First offense, forfeit bonus that day.

Second offense, forfeit bonus from that day back to first offense.

Third offense, automatic discharge.

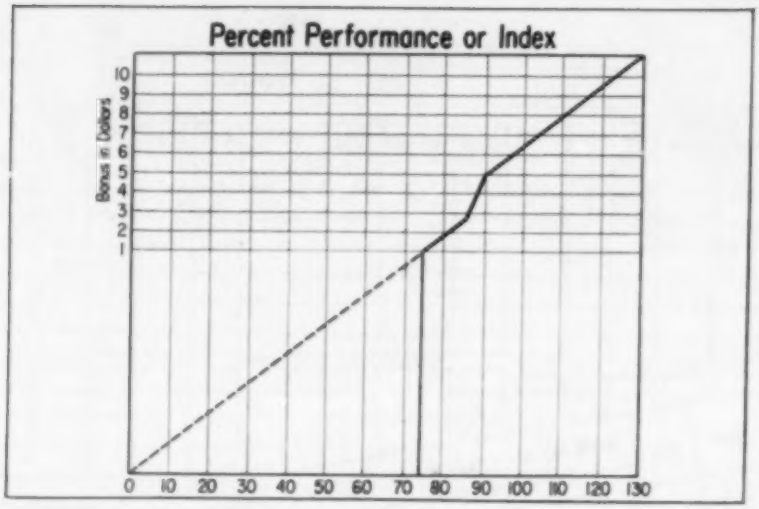
Incentive Plan

When Lorado Coal had completed its time studies and methods revisions, it established an incentive program for management. The plan, in effect, consists of a daily production bonus and a monthly safety bonus for section foremen.

The production bonus for face foremen is based on section rather than individual performance and payments start at 74% of the section potential. The performance or percent index (see daily production sheet) is found by means of the following equation:

$$\frac{\text{Section performance}}{\text{Section potential}} \times 100 = \text{Percent performance (Index)}$$

For example, if the unit has a potential of 92 cars per shift and the first and second shifts loaded 70 and 66 cars, respectively, the index would be approximately 73%. In this particular case the unit did not earn a



INCENTIVE PAYMENT PLAN is based on a straight line curve except in a small area where an increase requires extra effort on the part of foremen and men.



JOHN W. STRATON . . .
"An aggressive management which makes full use of an industrial engineering staff to investigate problems, gather facts and analyze opinions can make a greater number of informed and defensible decisions than can the same management relying only on its own investigations. Such investigations by management must be fewer in number or less comprehensive in scope because of the limited number of hours any one individual can work in a given day."



J. C. BOBELLA . . .
"To obtain the greatest yield from any industrial-engineering program, all levels of management must be completely convinced of its value, thoroughly understand it and follow up any conclusion or recommendation that may be derived from such a program. A management organization that does not conform to these basic requirements will in time defeat a program, no matter how well established."

bonus since the index was below 74%. As the index increases from 74%, the bonus increases accordingly.

The production bonus is based on a straight line curve except in a small area where a percent increase in unit performance requires extra or outstanding effort on the part of foremen and men. At this point the added incentive earns more for each percent increase up to a certain level, then the curve reverts to a straight line. The performance for each section and foreman is posted daily so that the foreman can keep himself updated about his rating and bonus earnings.

The safety bonus is quite attractive in that it offers foremen, over a 1-yr period, the potential of earning up to $225. It works this way: For the first 5 mo the foreman receives $5 per month if he has no accidents. For the sixth month, with no reported accidents he receives $50. After the sixth month and up to the twelfth month he receives $10 per month. If he has not had an accident during the 12-mo period he then receives a $100 bonus. From this point on, he receives $10 per month until an accident occurs, at which time he starts all over again.

The heads of departments—mine shift and general foremen—or cost control centers are on a production and cost bonus. These bonuses are figured monthly. Each cost control center stands on its own merits. In other words, one department could earn a bonus while the other did not. In addition to this, the production and cost bonus are independent of each other. A department could receive a production bonus but not a cost bonus or vice versa.

For each monthly cost bonus earned, only half is paid. The other half is held in reserve and accumulates over a period of time. If a 10% bonus was earned, the department head would be paid 5% with the other 5% held in reserve. If in the following month he did not earn a bonus but actually went in the hole 5% he would then lose his reserved 5%. On the other hand, if he earned another 10% he would have 15% and would receive a 7½% bonus for that month. The lowest a cost control center can go in the hole is 10% in any one month.

With this incentive plan it is possible for foremen and department heads to increase their earnings above base pay by up to 30%.

The industrial engineering program has been primarily concerned with production. But, the company is presently planning an expansion program to include maintenance, with emphasis on equipment inspection, preventive maintenance and scheduled overhaul. The officials at Lorado Coal recognize the importance of a maintenance program and feel that by emphasizing it they will further increase production and reduce cost.

Management and Supervisory Personnel Lorado Coal Mining Co.

T. L. Johnson, Operating Assistant
John W. Straton, General Superintendent
Marcus L. Milam Jr., Chief Engineer
John C. Bobella, Industrial Engineer
F. B. Amburgey, Resident Controller
Dudley Walls, Assistant Manager of Preparation
Roston Toler, General Mine Foreman
Creed Vance, Chief Electrician
Brady Marcum, Shop Foreman
J. P. Hawkins, AC Electrical Foreman
Earl Wentz, Preparation Plant Foreman
Willie Mullins, Truck Foreman



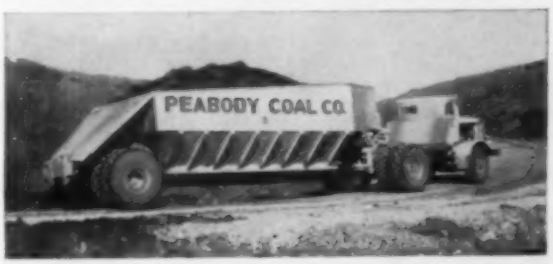
10 big "Euc" Coal Haulers at new Peabody Mine

At its River King Mine in Illinois, Peabody Coal Co. has ten of these 47-ton Bottom-Dump Coal Haulers. Powered by a 335 h.p. engine with 9-speed transmission, these "Eucs" haul their big loads from pit to preparation plant at speeds up to 34 mph. They average 16 trips per day on a 4 mile haul from shovel to plant and return.

Because they're engineered and built for heavy off-the-highway service, "Euc" Coal Haulers stay on the job longer, with less time out for repairs and maintenance. Their high job availability, combined with big capacity and fast travel speeds, pays off in more tons per shift. That means lower hauling costs and more profits.

Your Euclid dealer will be glad to provide a production cost estimate for your operation. He can probably show you how to cut your hauling costs and improve your profit picture . . . ask him for proof that Euclids are your best investment.

EUCLID DIVISION GENERAL MOTORS CORPORATION, Cleveland 17, Ohio



GM GENERAL MOTORS EUCLID

EUCLID EQUIPMENT

FOR MOVING EARTH, ROCK, COAL AND ORE

"To stay in business and make a profit, machines and methods must be continually updated. In the 41 yr our company has been in business we have recognized that we have to keep up to date with new machines and methods so we can maintain a favorable competitive position not only with other fuels but with the biggest and best companies in coal. In recent years because of the frequency of wage increases, increasing mining efficiency is becoming more and more important. We have spent money over the years not only to keep pace with wage increases but also to improve mining efficiency and safety. By investing money in modern mining equipment and better preparation facilities over the years, we have been able to make a profit."



PLANNING operations are Frank E. Williams Jr. (left), secretary-treasurer; Willis Riffle, mine foreman; and Frank E. Williams, president.

Raising Productivity by Updating

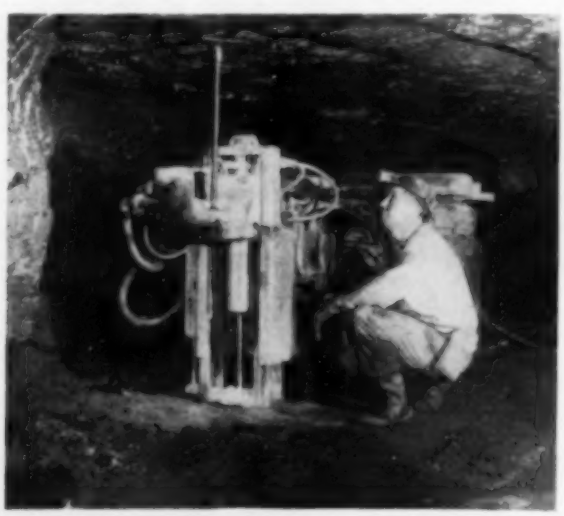
MODERNIZING to meet the challenge of changing market conditions while keeping pace with a constantly rising wage scale has consistently marked the 41-yr history of the Pecks Run Coal Co., Buckhannon, W. Va. From its beginning in 1917 as a handloading operation with mule haulage, the company has continually updated methods and machines.

As a result of applying new ideas and modern machines, productivity is 180% greater today than in 1917. The recent productivity record at Pecks Run is well above that of all manufacturing. For example, since 1947 wages in manufacturing have risen 68%, while output per manhour has gone up 32%. In the same period, wages in the coal industry have gone up 71% and payments to the welfare fund have risen from 5c to 40c per ton. Productivity at Pecks Run rose 53% since 1947—66% above the national average for all manufacturing.

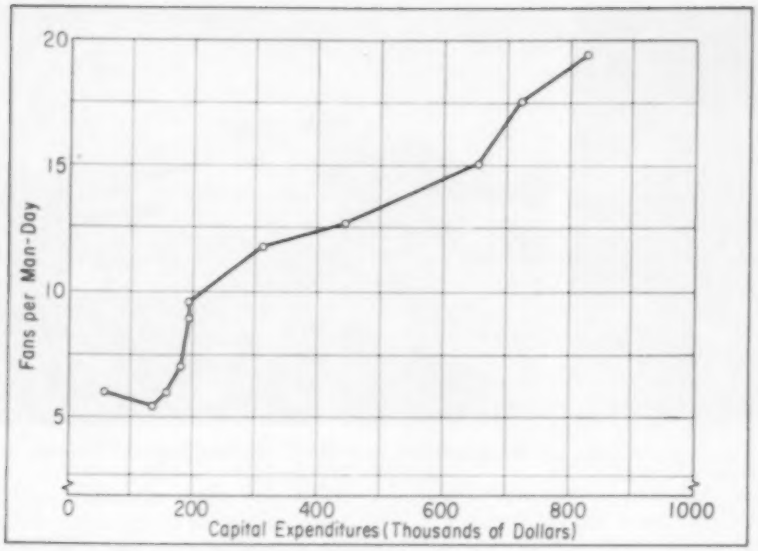
Management's policy is to apply progressive ideas and adapt the latest methods and machines to maintain a favorable competitive position.



ENTRY DRIVING, room and pillar work are tasks for boring-type miner. Unit makes two passes in driving 17-ft opening.



ROOFBOLTER installs 36-in bolts on one side while boring miner advances 25 ft on other side.

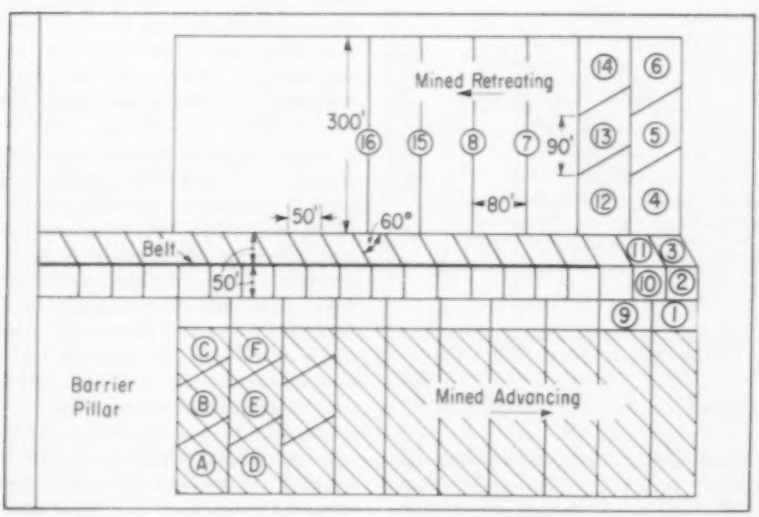


RESULT of continuing program of capital expenditures over the years is an increase in productivity in tons per man at Pecks Run Coal Co.

Mining Methods

To achieve this goal over the years, the company has held to the conviction that the application of new ideas coupled with good employee relations are major necessities. Since 1917, Pecks Run has invested $825,000 in plant improvements and new equipment. Each change in equipment and methods was designed to improve mining efficiency, increase safety and meet changing market conditions.

Pecks Run management recognizes the important role that employees play in the company's progress and credits the men with making a major contribution to the development of the company. As conditions and mining methods have changed over the years, the company has found the men able to handle new assignments and develop any additional skills as operators or mechanics. To help the men upgrade their skills, the company cooperated with the University of West Virginia to establish maintenance training classes, provided a classroom and paid the registration deposit for each man enrolling.



MINING PLAN in room panel includes three headings on 50-ft centers with one side of entry mined advancing. Letters and numbers show sequence of mining.

Today's Results

Today Pecks Run produces 19.3 tons of clean coal per man, excluding supervisory and clerical employees. In 1917, an average of 6.9 tons per man was mined. Output climbed to 11.7 after track-mounted loading machines were added. Another gain in productivity, to a new high of 12.6 tons per man, was registered in 1949, when off-track equipment went into service.

Continuous mining was introduced in 1954 when a Jeffrey Colmol was added. After a year of experience with continuous mining, output climbed to a new high of 17.4 tons per man. In 1955 the company added a Joy 3JCM continuous miner and all production from then on came from the continuous miners. Today's record of 19.3 tons per man is achieved with full continuous mining.

The Modernizing Program

Pecks Run was organized in 1917 by Frank E. Williams, president, who opened Kano No. 1 mine in the Redstone seam as a handloading operation with mule haulage. The first step in a modernization program destined to continue throughout the years was the addition of shortwall cutting machines in 1921. To provide DC power for the cutting machines, the company built its own power plant in 1920. Coal was machine-cut, hand-loaded and hauled by mules until 1938, when a Jeffrey 44D track-mounted loader and trolley locomotive were added. In 1943, a Cardox plant was erected and a Goodman 360 loader was purchased.

Modernization continued in 1944, when all-steel Differential 8-ton mine cars were bought and a rotary dump, 90-ton bin and other tipple changes were completed. A combination shop and supply building was constructed in 1946 so all maintenance work could be done at the mine.

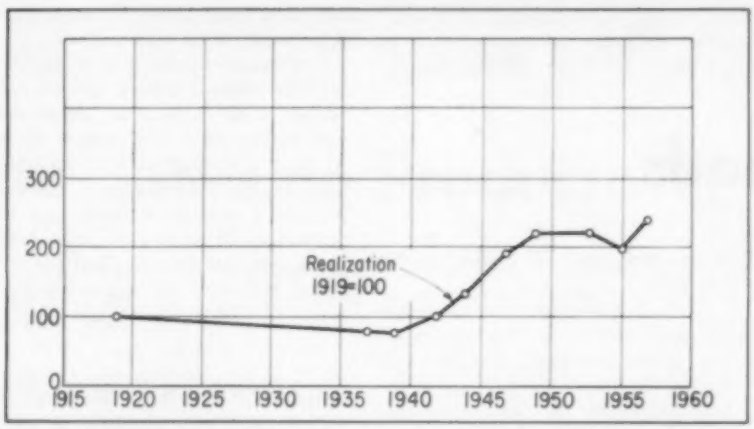
A major step in modernization was



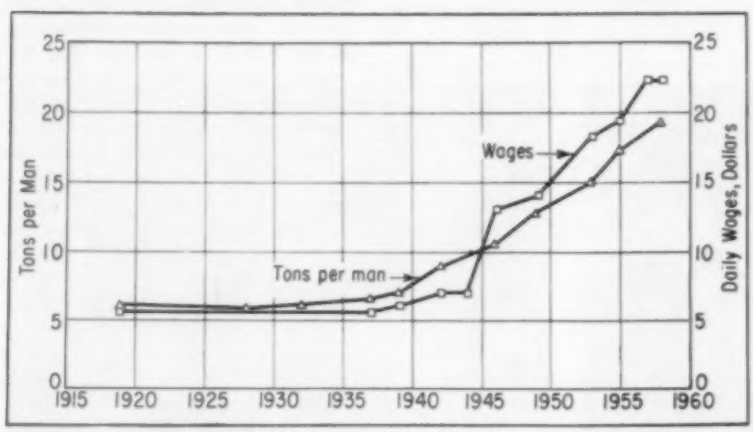
PILLAR RECOVERY is main job for ripper-type miner. Safer, faster extraction and better recovery are major benefits.



PREPARATION facilities in all-steel building sheathed in aluminum include washer and air jig.



HOW realization varied over the years in comparison to 1919 price.



HOW tons per man and basic wage rate have grown since the company started.

made in 1948 when offtrack mining equipment, including a Joy 14-BU loader, 10-RU cutter, CD-25 drill and 5-SC cars, was purchased to replace the track-mounted units. Two years later, a Jeffrey 52B belt conveyor equipped with Goodyear Coal Flow belt was added to transport coal in room panels. To improve the main-haulage system, a Jeffrey 17-ton locomotive was bought in 1951. A second offtrack mining unit was also purchased for mining pillars in isolated areas. Included in the second unit were a Joy 8-BU loader, Lee Norse shuttle car, Chicago Pneumatic 572 drill and Sullivan 7B cutter mounted on a Joy T-2 truck.

Another major step in underground modernization was taken in 1954 with the addition of a Jeffrey Colmol. In 1954, this machine produced an average of 400 tons per shift in selective mining, with peaks up to 500 tons per shift.

Equipment assigned to the continuous-miner section included the Colmol, Joy 14-BU pickup loader and two 5-SC shuttle cars. Section personnel consisted of a continuous-miner operator, loader operator, two shuttle-car drivers, one wireman, two timbermen, and one mechanic; a total of eight. Output per man-shift, including the foreman, averaged 44.4 tons in 1954.

A Joy 3JCM continuous miner is teamed with a Joy 8-BU loader, and 5-SC shuttle car in recovering chain pillars and isolated blocks of coal. A four-man crew made up of a miner operator, loader operator, shuttle-car driver and timberman-foreman produces an average of 55 tons of clean coal per face man. If cleanup work, moves, retimbering and wire work are charged to the section, output averages 40.5 tons per face man. Aside from maintaining a high output while working continuously in pillars the company notes that the rapid rate of extraction makes possible greater recovery and is safer.

Today's Mining Results

Pecks Run is now mining in its sixth opening in the Redstone bed, ranging from 50 to 72 in thick. The immediate roof is firm shale of varying thickness between 6 in and 30 ft. Sandstone, varying from 50 to 100 ft in thickness, overlies the shale. Total cover is over 200 ft where workings are under the center of hills. The coal has a medium-hard structure with definite face and butt cleats. It is underlain by a firm shale. Impurities in the form of sulphur balls and clay veins sometimes are encountered in the seam.

The Colmol is employed to develop room panels, drive rooms and extract pillars and the Joy 3JCM works exclusively in pillars in isolated areas. The panel mining plan includes three headings on 50-ft centers with breakthroughs, spaced 50 ft apart, always cut from one outside heading across the middle heading to the other outer heading. To simplify machine maneuvering, the first crosscut is cut at a 60-deg angle. Then the second is cut at 90 deg to keep the four-way intersection open area to a minimum. Rooms, on 80-ft centers, are driven 90 deg with the headings to a depth of 300 ft. Breakthroughs on 90-ft centers are driven 60 deg with rooms.

All openings are driven 17 ft wide by taking two passes with the Colmol. The machine advances one side of the face about 25 ft, making an opening 9 ft 6 in wide. Then the machine is trammed back and moved over to take a second slice parallel to the first. To keep the opening to the 17-ft width and at the same time get the best possible cleanup, the second pass slightly overlaps the first.

As soon as the Colmol completes a 25-ft initial advance and is in position to make the second pass, the special narrow Fletcher roofbolter is moved into the first cut. Bethlehem 36-in expansion-type bolts are set 6 ft apart in a row 5½ ft from the rib. Bolting alternates from side to side as the miner advances. This bolting pattern has been practiced since January, 1957.

Pecks Run officials note several benefits of roof-bolting, including increased safety at and near the working face, better recovery of coal and more uniform production. In fact, bolting has made possible recovery of some blocks of coal that otherwise would have been lost. As a result of the better roof control possible with bolting, the company expects to go back into an area previously abandoned because of bad roof. No roof problems are anticipated.

Today output from the seven-man Colmol section averages 57.5 tons of clean coal per face man, including all breakdowns. If delays, such as, belt moves and track work are charged to the section, output averages out to 47 tons per face man.

Current practice in room panels is to advance the three headings far enough for three rooms to be turned in by the barrier pillar. Then these rooms are first advanced 300 ft, then the two rows of room pillars are ex-

Face Modernization

☐ Substitute machines for manual operation wherever possible.

☐ Investigate the possibilities of continuous mining if not already the practice. Manpower usually is cut 50% or more for the same or greater output. New designs of machines are providing similar savings in thin coal.

☐ Substitute new high-capacity machines for old lower-capacity units when the savings warrant. A loader that will turn out another 100 tons per shift, with no change in other equipment or manpower, could raise income for the section $100,000 or more per year.

☐ Make sure of balance in the cycle so that loading or mining is not held up by cutting, bolting and so on. Replace slow units with high-capacity equipment, where necessary to attain the desired balance for maximum loading performance.

☐ Provide transportation that will insure maximum continuity of machine operation.

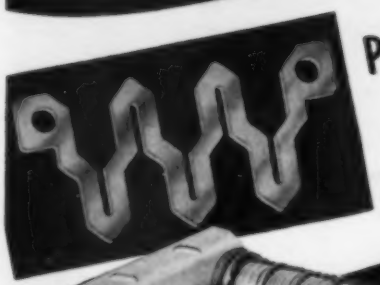
☐ Keep breakdowns and production interruptions to a minimum by good power, modern maintenance, a good supply systems, good roof control, efficient ventilation and the best in other face-supporting services.

For a complete discussion of all phases of face operation, including basic principles and the latest in equipment and methods, see the Coal Age Mining Guidebook, Mid-July, 1958.

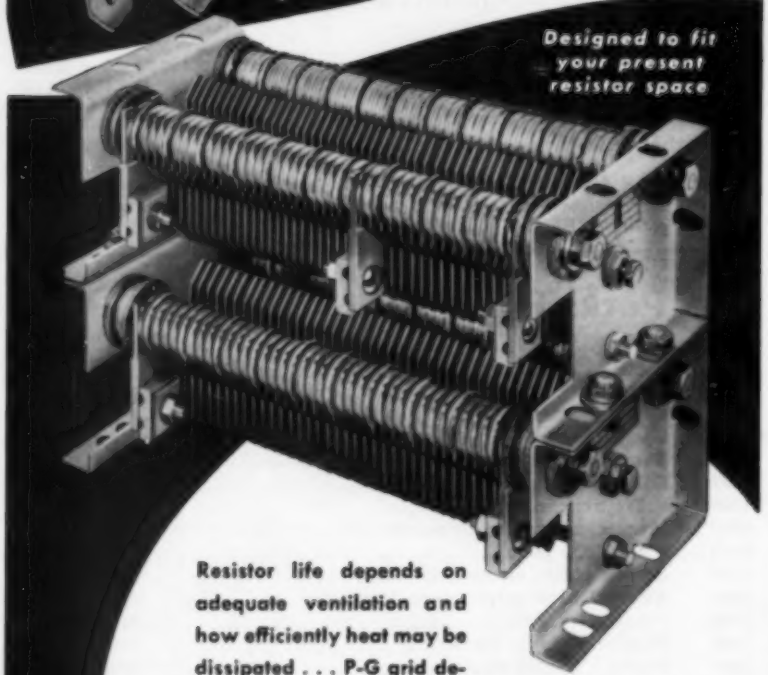
Pecks Run Progress Milestones

Year	Item	Investment to date
1917	Open No. 1 mine	$29,963
1920	Power plant, mine cars	58,495
1923	Open No. 3 mine	78,017
1926	Mining machines; track to No. 5 mine	130,463
1927	Equip No. 5; additional track	156,045
1928	Substation; mine cars	172,121
1938	Mechanical loader; sizing screens	185,729
1940	Open No. 6 mine	192,754
1943	Cardox plant; mechanical loader	200,220
1944	All-steel mine cars; rotary dump; bin	240,798
1945	Preparation plant	312,476
1946	Shop and supply house	322,731
1948	Offtrack mining equipment	400,248
1949	Locomotive; substation	444,459
1950	Belt conveyor	459,705
1952	Offtrack equipment; preparation additions	535,885
1953	Continuous miner; locomotive; car spotter	656,970
1955	Continuous miner; air jig; substation; vibrator	722,081
1956	Washer; roof-bolter	817,115
1957	Shuttle car	825,669

Resistor life depends on adequate ventilation...



Patented P-G Grid Design assures maximum ventilation



Resistor life depends on adequate ventilation and how efficiently heat may be dissipated . . . P-G grid design equalizes the amount of air space surrounding each leg or loop to obtain even heat throughout the grid area. (Note illustration.) . . . Since heat is rapidly and evenly dissipated, hot spots fail to develop and longer resistor life is assured . . . For a nonbreakable resistor (only steel and mica used) specify P-G on your next application.

P-G

The Nonbreakable Steel Grid Resistor

THE **POST-GLOVER** ELECTRIC COMPANY

OFFICE and FACTORY—Kenton Lands Road, Erlanger, Kentucky

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tracted, except for stumps left to protect the headings. Pillars in one room are completely removed before those in the second room are mined. As soon as both sets of room pillars are recovered, the Colmol advances the headings far enough for additional rooms to be driven and pillars recovered. This system continues until the panel limit is reached.

Rooms are mined on the retreat on the other side of the panel. Three rooms are first advanced 300 ft, then pillar work starts with removal of the room stump left on the opposite side of the entry. Next the two chain pillars are recovered. Then the row of pillars between the last two rooms is removed, starting with the pillar nearest the heading and progressing to the room face.

Two new rooms are then driven, followed by removal of another row of pillars between the two previously driven rooms. Pillar work always begins with removal of the room stump on the opposite side of the entry and continues to the room face. Details of mining in a room panel are shown in an accompanying sketch.

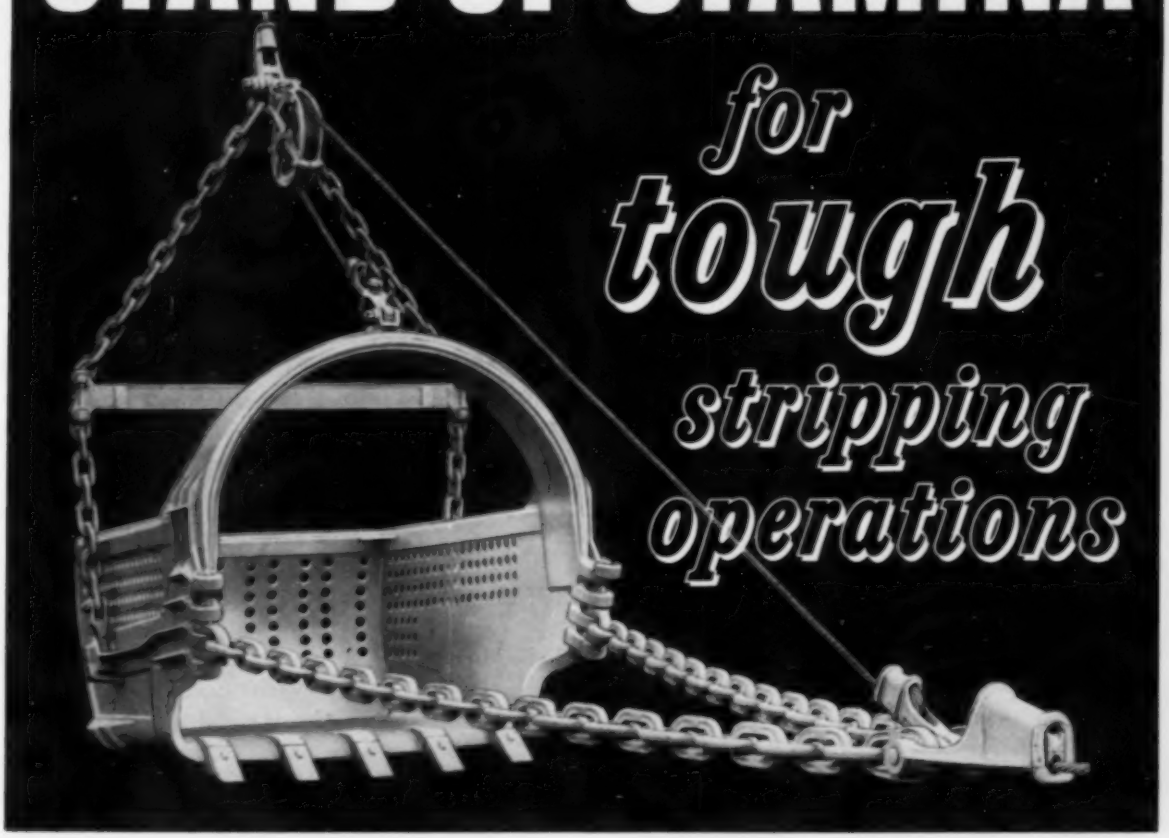
Coal Preparation

Coal is hauled 3 mi to the preparation plant in 11- and 9-car trips by Jeffrey 17-ton and Westinghouse 908 locomotives, respectively. While one locomotive is making a round trip to the rotary dump, the other is underground assembling another trip.

Raw coal is dumped into a 90-ton bin from which it is fed to a 48-in raw-coal belt and delivered to the cleaning plant. It then is split into plus ¼-in, ¼x8M and 8Mx0 fractions by an Allis-Chalmers 5x12-ft Ripl Flow vibrator. The ¼x8M flows to a 35-ton bin over a Brusset air jig where it may be directed either to the jig or bypassed, depending on the ash and moisture content. The plus 1¼-in discharges onto the upper strand of a 3-compartment conveyor which carries it to a Prins washer.

Clean coal is dewatered on a Hewitt-Robins 5x12-ft vibrator, which makes a three-product separation into 2½ x 1¼, 1¼ x¾ and minus ¾-in sizes. Each of the sizes may be carried in the three-compartment conveyor and loaded separately on one of three tracks. The clean or bypassed ¼x8M mixes with minus ¾-in washer product and is delivered to railroad cars. All refuse is elevated to an 80-ton bin and later trucked to a disposal area.

STAND-UP STAMINA



for tough stripping operations

"HENDRIX MH"

Heavy Duty Mining Buckets

4½ to 14 Cubic Yards With or Without Perforations

HENDRIX MANUFACTURING CO., Inc.
MANSFIELD, LOUISIANA

Hendrix DRAGLINE BUCKETS

HIGHER ARCH · WIDER FRONT · TAPERED BASKET · GREATER STRENGTH

Why settle for less, when one of Caterpillar's modern heavy-duty Diesels will fit your needs?

Here's what some owners and users, who wouldn't settle for anything but CAT power, think of their diesels:

"As good an engine as I have ever seen!"
—Tim Fleming, co-owner, Fleming Coal Co., Wise, Va.

"These Cat Engines are economical to operate and don't break down!"
—G. W. Moore, owner of the Moore Coal Co., Wise, Va.

"Our Cat Engines are easy to maintain and have a long life span!"
—A. J. Schmidt, purchasing agent, the William Aloe Coal Co., Imperial, Pa.

"We get good all-around service from our Cat equipment, and from our Caterpillar Dealer!"
—Roy Coulson, division superintendent, Vitro Minerals Corp., Riverton, Wyoming.

This is typical of owner-user reaction to Cat Diesels. Hundreds of power unit combinations are available to match your specific loads. Cat Diesels are compact, and have a record of highly satisfactory use in all diesel applications throughout the world. And the dealer parts and service that stand behind them insure a minimum of down time.

Each diesel reflects the very latest Caterpillar research, to up production and lower operating costs. Bulk has been eliminated, and extra power and longer life have been added through superior design and metallurgy. The fuel system of Cat Engines requires no adjustment. There are no cylinder ports to clean and Cat four-cycle design provides a smooth, efficient utilization of power. These and other features add up to new performance standards in diesel power.

So, for original power or repowering, it will pay you to specify Cat Diesels, available in over 150 other manufacturers' machines. And your nearby Caterpillar Dealer can solve your power problems and give you greater profits.

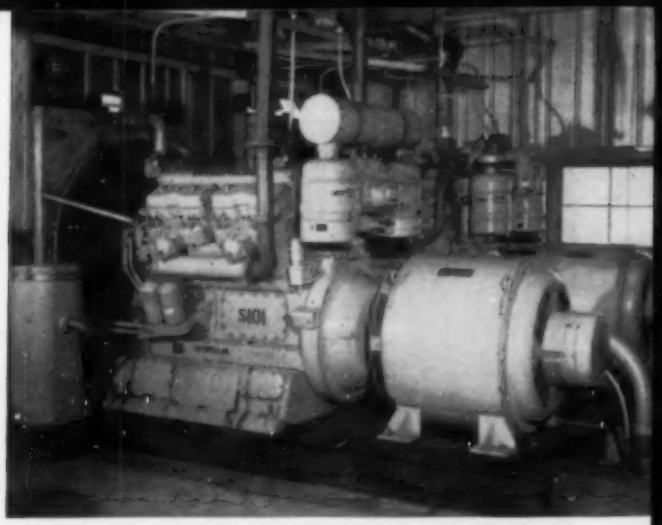
Engine Division, Caterpillar Tractor Co., Peoria, Ill., U. S. A. Caterpillar and Cat are Registered Trademarks of Caterpillar Tractor Co.

A Cat D397 Diesel furnishes power for this Lima shovel, and a D375 powers another shovel loading out slag from stockpile in Steelton, Pa., for C. J. Langenfelder & Son, Inc. Cat Engines are compact, and stand up in the rough shovel work.





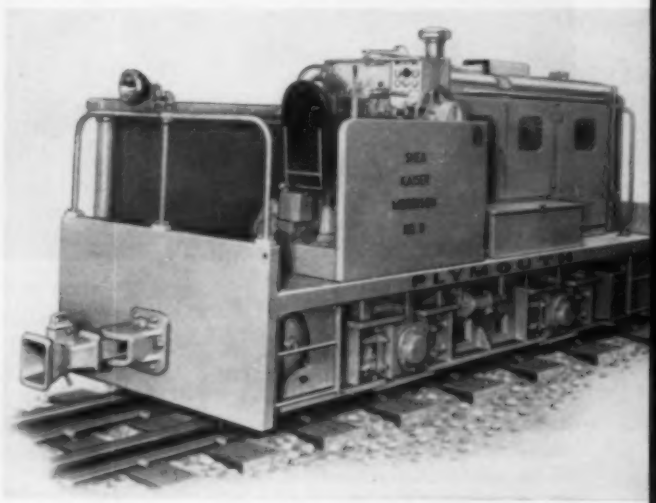
Portable power can move with your job. Here a Cat D397 Mobile Electric Set supplies power for a shaft-sinking operation in uranium fields near Grants, New Mexico. Cat Mobile Electric Sets are dependable, easy to start, and easy to service.



When mining operations begin many companies rely on Cat Diesels. These D375s supply over 450 KW to power hoist, lights, ventilation and battery-charging equipment for underground uranium mine, where "second best" power won't do.



A Cat D318 Diesel Engine powers this Bucyrus-Erie shovel stripping overburden from clay deposits for cement manufacture. Owner of rig is Elmer Gower, Kunkletown, Pennsylvania. Cat engines provide dependable power for excavators.



One of a number of Cat Diesel powered Plymouth locomotives now serving underground on the Trinity River Project near Whiskeytown, California. Owned by Shea Kaiser Morrison, a Cat D326 (Series F) powers this model JL 15-ton unit.

ENGINE POWER BY CATERPILLAR

Engine Division, CATERPILLAR TRACTOR CO., Peoria, Illinois, U. S. A. **Dept. CA10**

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- ☐ I am interested in general information.
- ☐ I would like the names of the 150 manufacturers who can supply Cat power in new equipment.
- ☐ I would like specific information about Cat Diesels for repowering.

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Company _____

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PACESETTER in Gilberton Coal Co.'s modernization program is new walking dragline with 200-ft boom and 32-yd bucket.

Gilberton Coal Tools Up for Modern Stripping

Last word in stripping, loading and overburden preparation equipment extends company's range of operations and assures top efficiency in years immediately ahead.

IN THE PAST 3 YR GILBERTON COAL CO. has bet $2½ million that it can hold its share of the anthracite market and even expand its sales. The big bet by Gilberton Coal, which was made after a careful assessment of the odds, is in the form of capital investments for high-capacity equipment that will make it possible for the company to run with the leaders. Gilberton's stripping equipment now ranks with the most modern in the industry.

Included among the new acquisitions are a Bucyrus-Erie 1250-B dragline to extend the stripping range, a new 50-R drill to prepare the broken rock to keep this 32-cu yd dragline busy, and a 6-yd front-end loader to provide an ultra-modern coal-loading system. Gilberton's modernization program also includes the purchase of an 8-yd P&H 1800 shovel which leads a bench-stripping



HIGH-CAPACITY FRONT-END LOADER lifts coal stockpiled by dragline into 32-yd coal haulers at rate of 500 tph.



LOADER moves to truck instead of requiring pinpoint spotting, it does its own cleanup, trams to new sites at 20 mph.

phase of operations in deeper areas of the pits, and this excavator is preceded by a second 50-R drill.

Spearheading this modernization drive is John B. Rich, president of Gilberton Coal Co., Gilberton, Pa.; John W. Rich, president of Draper Contracting Co., the operating subsidiary, and Gorden E. Smith, general manager of both enterprises. Robert Dewald is sales manager; William Bashas is superintendent of stripping; Sam Beaver is master mechanic, and Robert Brennan is chief electrician. The outcome of the modernization program is that the company now is ready to supply high-quality Bear Ridge anthracite in quantity.

Stripping Methods

The 200-ft boom of the 1250-B makes it possible for the machine to dig efficiently at a depth of 130 ft below the bottom of the tub of the unit. Present plans are to use the big machine to strip overburden down to this depth, then to move in with shovel-front units to work out 40-ft-thick benches to a final depth which is imposed by spoil-haulage limitations or by the level of the water impounded in the old underground workings. In some instances smaller draglines, like the 5-yd Bucyrus-Erie Model 120, follow the 1250-B where spoil room can be made available in the pit.

The latter course of action is taken where the pitch of the measures is relatively less steep, thus the pit is wider. Pitch of the measures varies from 0 to 70 deg in the two basins worked by the company. Virtually all of the company's production comes from the Mammoth vein in these two basins, known as the Mahanoy and Turkey Run basins.

The rock divider between the two splits of the Mammoth vein may occur up to 80 ft in thickness. In some places it may disappear altogether. Where the rock divider is present the coal thicknesses are 10 ft in the top split and 15 ft in the bottom split. Where the two splits come together the coal thickness may reach a maximum of 40 ft, although 24 ft is average.

Most of the coal has been first-mined by deep mining methods, leaving breast pillars and the solid chain pillars between levels to be recovered by stripping. The stripping ratio projected by Gilberton officials is 8½ to 1, yard for yard, in the original removal of material. However, since the yield in clean coal is about 54% of the raw material produced at the pits, the actual ratio is accordingly increased.

The big dragline, swinging the largest bucket in the anthracite region, excavates cuts down the 130-ft depth. The bench from which it works is prepared by the dragline itself and a Caterpillar D-9 bulldozer. The cuts now being worked by the 1250-B are on north-south lines with spoiling to the west. The machine is positioned on the centerline of the cut to provide minimum swing from loading point to spoiling point. Careful planning of the work makes it possible to keep the swing to 90 deg or less.

The crew includes an operator, an oiler on the machinery deck and a second oiler at the lower frame. Each of three crews works a 7¼-hr shift per day. The remainder of the time is devoted to maintenance and inspection by the operating crews and the company maintenance force. Overburden removed by the 1250-B averages about 18,000 cu yd per day.

Loading Coal

One of the difficulties encountered in stripping in these pitching measures is the need for using the stripping unit to remove the exposed coal from the pit. This tends to reduce the maximum possible overburden output of the stripping unit. However, the concept at Gilberton is to view stripping and loading as a combined operation on the 1250-B jobs and to concentrate on increasing the efficiency of this combined operation.

To achieve this result the conventional shovel-front loader was replaced by a rubber-tired front-end loader, as previously mentioned. This unit retrieves the coal from the stockpiles deposited on the stripping bench by the 1250-B, loading a 32-yd truck in 4 to 5 passes.

A loading rate of 500 tph has been sustained under good conditions with this loading system. The loader is equipped with four-wheel drive and steer and is pivoted between front and rear axles to provide the shortest possible turning radius. It is operated entirely by one man and does it own cleanup chores at the stockpile. Furthermore, it can tram from one stockpile to another at a speed of 20 mph, thus making it unnecessary for the large stripping unit to spot the coal to accommodate a loading shovel. This results in increased actual stripping time for the 1250-B and faster exposure and recovery of coal.

The coal-haulage fleet consists of seven Euclids with specially made 32-yd dump bodies. The steel bodies were made to Gilberton specifications by Steel-Fab, Inc., Patterson, N. J. Width of the bodies is 11½ ft and the top is 12 ft above the ground. The loader fills a truck in about 3 min. The company also operates 16 Euclids equipped with 20½-yd rock bodies for spoil haulage in bench stripping.

This loading system further increases overall efficiency by eliminating a need for constructing ramps



FOUR SCOOPS in from 2½ to 3 min load the big, specially-built truck bodies. Height of truck body is 12 ft above ground.

another

DORRCO FLUOSOLIDS COAL DRYING SYSTEM

Now on stream at

INLAND STEEL...

Another large Dorrco FluoSolids coal drying system was recently put in operation at the Inland Steel Company's new coal drying plant at Price, Kentucky.

Currently, the system is removing 22.0 tons of water per hour from a wet feed of 180 tons per hour of ⅝" x 0 metallurgical coal.

These statistics, however, show only a partial story, for FluoSolids coal drying, when compared with conventional thermal drying techniques, is proving commercially to provide higher efficiency, higher capacity, closer operating control with lower maintenance.

Operating data substantiating these facts are available. For the complete Dorrco FluoSolids coal drying story . . . and more significantly how application of the system can benefit your plant operation, write to Dorr-Oliver Incorporated, Stamford, Connecticut.

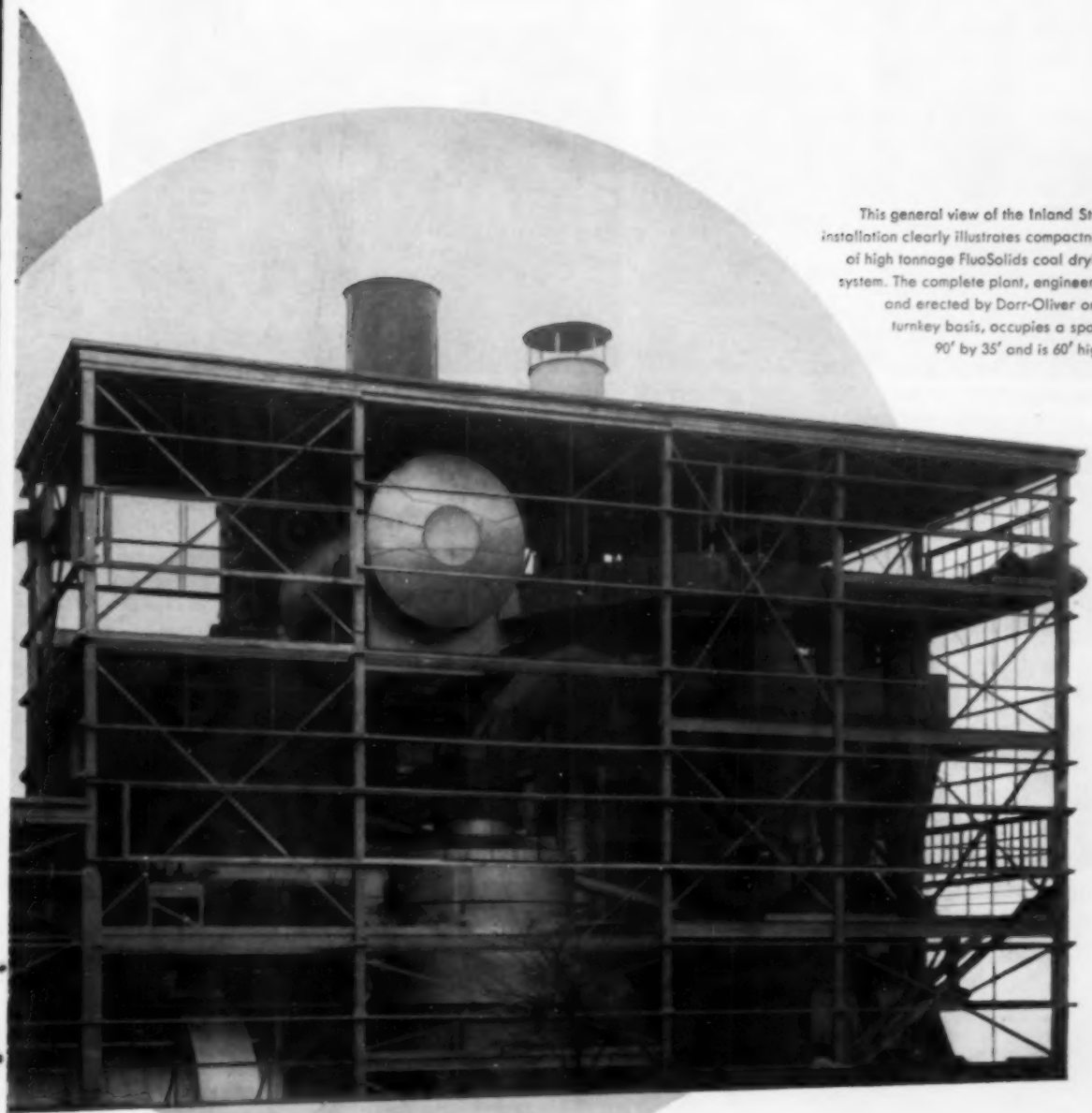


What is the FluoSolids System?

A VALUABLE TOOL FOR DRYING, SIZING AND HEAT TREATMENT

When particles are suspended in an upwardly moving stream of gas, the entire dense mass behaves much like a liquid and is said to be fluidized. Applied to coal drying by the Dorrco FluoSolids system, fluidization results in a new and better drying technique, in which the efficient mixing action of the fluidized bed instantaneously transfers the heat from preheated air to the wet coal. A combination of reactor, blower, cyclones and other auxiliary equipment forms a complete processing system, adaptable to a wide range of drying, sizing, roasting and heat treatment applications.

HELP FOR YOUR PROBLEM: The science of fluidized coal drying was pioneered by Dorr-Oliver. The benefits of this vast experience can be profitably applied in your plant. If you will send us a brief outline of your problem, we will be glad to have an engineer call at your plant for further discussion.



This general view of the Inland Steel installation clearly illustrates compactness of high tonnage FluoSolids coal drying system. The complete plant, engineered and erected by Dorr-Oliver on a turnkey basis, occupies a space 90' by 35' and is 60' high.

DORR-OLIVER
INCORPORATED
WORLD-WIDE RESEARCH • ENGINEERING • EQUIPMENT
STAMFORD • CONNECTICUT • U. S. A.

Dorrco and FluoSolids are trademarks of Dorr-Oliver Incorporated. Reg. U. S. Pat. Off.



12¼-IN BLASTHOLES are made by rotary drill in 24x30 ft diamond pattern to prepare overburden ahead of large dragline.



AMMONIUM NITRATE and fuel oil, separately trucked to site, provide low-cost blasting to supplement improved drilling.



FUEL OIL is poured on prills in bags or directly into holes. Mixing at holes increases safety in explosives handling.



SECONDARY-SHOOTING in benching operation is done by two-man crew using crawler-mounted drill and compressor.



SHOVELS remove 40-ft-thick benches of overburden after dragline stripping limit has been reached. Spoil is hauled out.



10-YD DRAGLINE at left removes top lift of overburden while 6-yd unit in distance recovers final coal and backfills pit.

into deep pits, and wear and tear on the trucks is reduced since they are not required to haul loads on steep grades. Still another contribution of the system is the easily accessible raw-coal stockpile which it provides to isolate the cleaning plant from field delays. A stockpile of sized clean coal is built up at the cleaning plant during the summer months to take care of peak demands for the company's product.

Preparing Overburden

Overburden-preparation methods at the Gilberton projects must be geared to wide variations in natural conditions. The rock to be drilled varies in thickness according to the pitch of the strata. Some areas of overburden are broken up by subsidence over old workings. Although most of the rock is massive sandstone, there are some shales and areas of varying hardness. And the necessity of limiting vibration is the overriding consideration in some instances. Therefore, drilling and shooting methods and selection of explosives are matters for daily study in achieving optimum results.

In commenting on his company's modernized overburden-preparation methods, Mr. Smith points out that the combined cost-cutting effects of the new rotary drills and fertilizer-grade ammonium nitrate as the base for explosives have made possible a major increase in stripping range. An extensive increase in coal reserves has been made available. This fact lengthens the future for the Gilberton enterprise in this area, and justifies the purchase of machines such as the 1250-B dragline.

The first Bucyrus-Erie 50-R drill was purchased by the company 3 yr ago. This machine drills a 9⅞-in hole. The second 50-R has been in operation 1 yr, and this machine drills 12¼-in holes.

A 24x30-ft diamond pattern is the normal plan for the new drill. Holes are drilled to the coal at whatever depth is dictated by the pitch of the strata. A 3-ft cushion of drill cuttings is placed in the bottom of each hole to protect the coal from unnecessary breakage. The weight of the overburden on the pillars has fractured the coal sufficiently to permit recovery with reasonable ease.

Prilled fertilizer-grade ammonium nitrate is shipped by American Cyanamid Co. in carload lots to the Gilberton property. The bagged material is transported to the shooting site by truck and the fuel-oil admixture is transported in a separate tank truck. Thus the ingredients for making the final explosive are combined either in the hole directly or at the top of the hole for maximum safety. The mixture is 0.8 gal of fuel oil in each 100 lb of prills.

The primer charge is American Cyanamid's Cyadyne in 12½-lb cartridges and detonation is initiated through two lines of reinforced Primacord. This combination provides the fastest possible rate of detonation in a charge of prills and fuel oil alone. However, this rate may not be fast enough if the overburden is broken. In broken ground true explosives, such as Cyamite or Accomite, are substituted partially or wholly for the prills-oil mixture.

The faster detonation wave of the true explosives produces better fragmentation in broken ground. The gases from the slower-acting mixture are dissipated in the fissures of the rock without doing the required useful work.

Limiting Vibration

In situations where vibration is a problem the rule is to limit the number of holes to be detonated at one time. From 6 to 9 holes is normal practice in such instances, while in freer areas as many as 60 holes may be detonated in one shot. In addition the holes in sensitive areas are charged in decks. Millisecond delays are used between holes and between decks in individual holes to minimize vibration. Two long-wire M-S caps are placed in each deck to insure the proper sequence of detonation. As many as three decks have been used in some situations.

The company's first 50-R drill, ployed on the bench stripping jobs in preparing broken rock for the 8-yd which makes 9⅞-in holes, is em- P&H 1800 or a 6-yd Marion 151-M

Stripping Modernization

☐ **Use modern high-capacity long-reach shovels and draglines for greater overburden rates in higher banks.**

☐ **Consider auxiliary excavating and transporting units for removing top material and extending stripping range in thicker material.**

☐ **Adopt modern high-capacity drilling units, vertical and horizontal, for saving labor and attaining a better hole pattern in overburden preparation.**

☐ **Use low-cost breaking mediums for overburden, plus modern charging systems (blowing for instance) and mechanical tampers.**

☐ **Explore the possibilities of modern ripping for breaking clay, shale and coal for removal or loading.**

☐ **Provide power facilities that have the requisite capacity, include protection and have the maximum degree of portability.**

☐ **Use big high-speed haulage units for greater output per dollar invested in equipment and operating labor.**

☐ **Consider belts or railroads from field transfer stations for low overall haulage cost.**

☐ **Provide modern facilities for lubrication, including automatic systems, and for maintenance, including shops and field-service trucks, cranes and transporter.**

For a complete discussion of all phases of stripping and related activities, including basic principles and the latest in equipment and methods, see the* Coal Age *Mining Guidebook, Mid-July, 1958.

shovel. The rock is hard sandstone, making it difficult to achieve good breakage at bench level without tightening up the drilling pattern excessively. In these areas well-planned secondary shooting of the projections at bench level permits the use of an expanded pattern for the 50-R.

Secondary shooting equipment consists of an Ingersoll-Rand Crawl-IR drill and a separate 600-cfm Ingersoll-Rand Grya-Flo compressor. The crawler-mounted unit is equipped with a 5-in drifter on a hydraulic-powered boom. The machine drills 3½-in holes using Kennametal carbide-tipped bits. Trimming holes are drilled and shot in the rock projections ahead of the shovels to finish the bench.

Compressed air for operating the hydraulic pump for the boom and the air motors for the tramming crawlers is furnished by the rubber-tired compressor. The compressor is towed from place to place by the crawler-mounted drilling unit.

Consumption of explosives in preparing all overburden for stripping averages 0.75 lb of explosives per cu yd of rock.

Service for Stripping

Maintenance procedures at Gilberton are geared more to the needs as discerned by inspection of the equipment than to rigid schedules based upon mileage or hours of operation. This reflects the variations in conditions to which the equipment is subjected. For example, the teeth on dragline buckets may wear faster in some sections of the workings than in others. Or trucks may work on more severe grades for limited periods with resulting increased wear and tear. For this reason a major share of Gilberton's maintenance effort is devoted to inspection. In fact, each major unit is visited one day each week by mechanics and electricians who conduct an overall inspection. Repairs are ordered according to the needs indicated by these weekly inspections.

A fully-equipped truck repair shop is maintained in the service area, including facilities for rebuilding engines and for testing and repairing all electrical auxiliaries. Engines are rebuilt when oil consumption increases or oil pressure drops. Other bays are equipped to handle suspension repairs, wheel repairs and so on.

Also in the service area is a parts-supply room containing a full list of parts and supplies which is controlled by a Kardex system of accounting. A full-time storekeeper is in charge of receiving and issuing materials from the supply room.

A welding shop for the repair of large dragline buckets now is under construction, and each of the major excavating units is equipped with its own 400-amp welding outfit.

The company also has in operation four smaller draglines and two Caterpillar D-9 and five D-8 bulldozers. Three of the smaller draglines are diesel-powered. The three larger draglines, the two shovels and the two rotary drills operate on 4,160-V electric power.

Power from Pennsylvania Power & Light Co. facilities is transmitted at 66,000 V to the Gilberton substation where it is stepped down to 4,160 V. Overload, surge and ground protection is installed at the distribution centers of each pit.

Spend a little— SAVE A LOT!

STAMLER EQUIPMENT cuts your cost on EVERY CAR YOU LOAD

It pays for itself in short order and remains a SOUND, MONEY-MAKING INVESTMENT for a LONG TIME!

HOW LONG does it take equipment to pay for itself in your mines? IN WHAT SHAPE is the equipment after it has paid for itself? Stamler users can give you some interesting answers to these important questions as they pertain to Stamler equipment.

FIRST, Stamler Car Spotters can load more coal . . . faster, more efficiently and at lower cost . . . than any other method. THIS MAKES STAMLER EQUIPMENT PAY FOR ITSELF IN RECORD TIME.

SECONDLY, Stamler's smooth-working hydraulic design operates with so little wear-and-tear that STAMLER EQUIPMENT IS IN PERFECT CONDITION AT THE END OF THE TIME IN WHICH IT HAS PAID FOR ITSELF.

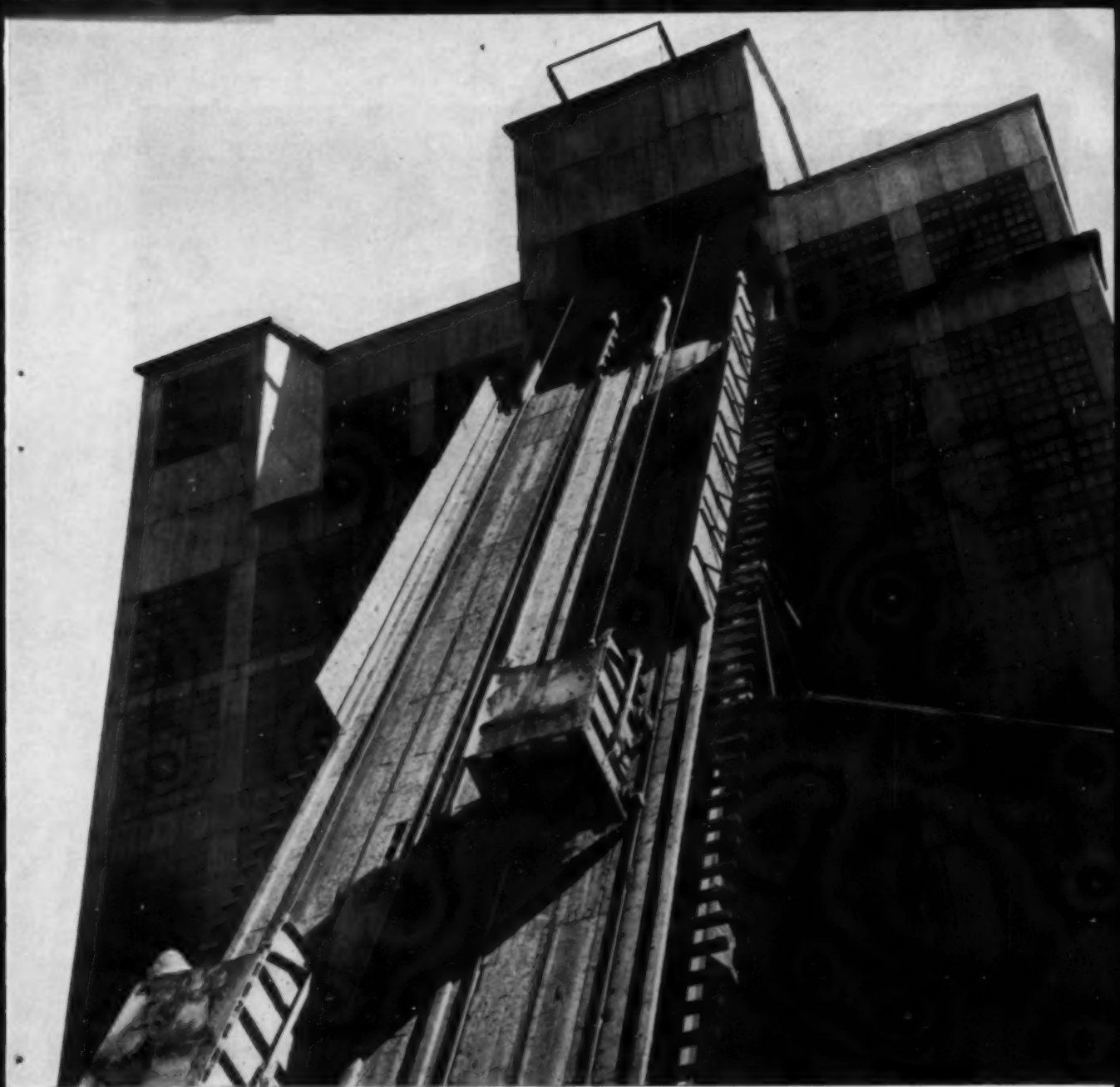
Thus, Stamler equipment KEEPS ON paying dividends. It returns your original investment FAST. Then it pays for itself over and over again with continued savings on every car you load. In the meantime . . . maintenance and parts expenses are not even worth mentioning. Ask any Stamler user. *Then ask us to send a man around to see you.*

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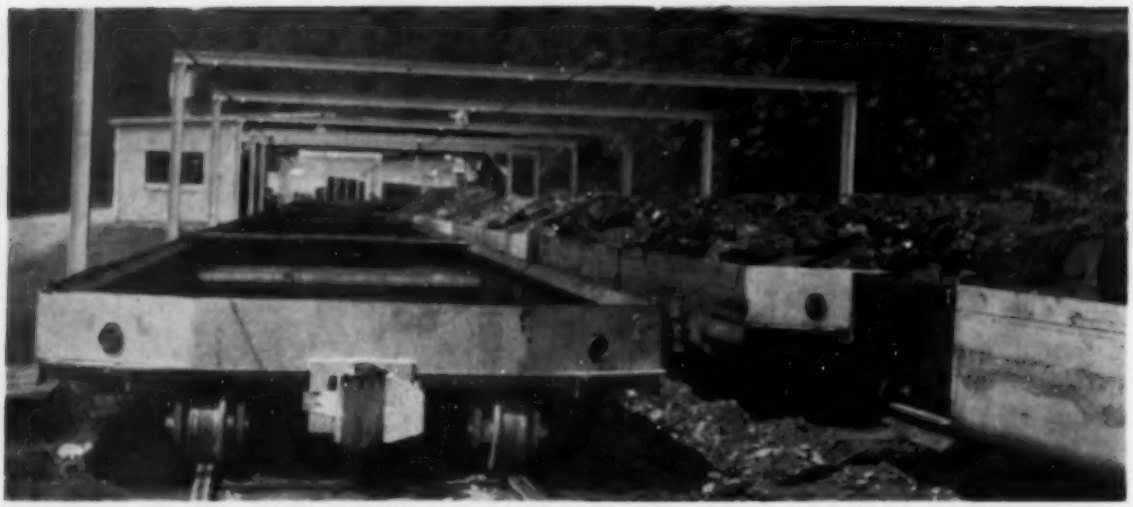
Can Move 12,000 Tons Daily. This is the gunboat plane of the Coaldale Mining Company, Coaldale, Pa.—one of the most efficient inclined haulageways you'll find. Loads from the rotary dump are whisked up the plane to the breaker, where only a few seconds are required for the drop. Though the plane is built at a steep 61 degrees, the high-powered system can handle more than 12,000 tons of coal in a normal working day.

The balanced hoist is rigged with Bethlehem Type U wire rope, Purple Strand grade. Type U is a 6x21 construction combining strength, flexibility, and abrasion-resistance. This tough, durable 2-in. rope has always proved a match for the heavy loads and uphill pull at the Coaldale incline.

Bethlehem Steel Company, Bethlehem, Pa. On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

Mill depots and distributors from coast to coast stock Bethlehem rope for the following industries and numerous others:
MINING • QUARRYING • CONSTRUCTION • EXCAVATING • PETROLEUM • LOGGING • MANUFACTURING





NEW MINE CAR, tailored to fit Inland Steel's 34-in coal, carries a 9.6-ton payload. Safer, smoother and faster transportation at lower cost are benefits. Car is 24 ft 6 in long, 7 ft 11¾ in wide, 24 in high and has automatic couplers.

New Mine Cars Cut Haulage Cost 33%



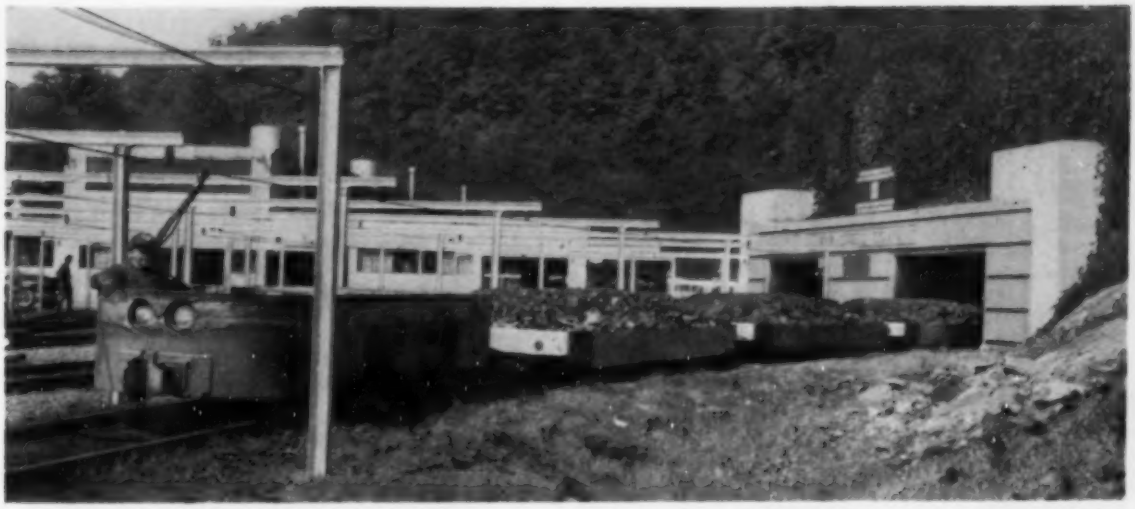
OLD CAR could carry only 2.9 tons of coal, had link and pin coupler. New units carry 9.6 tons and hold the road better. Safer haulage is added benefit.

Safer, smoother and faster transportation at lower cost are top gains from big 262-cu ft mine cars especially tailored to fit 34-in coal at Inland Steel mine.

A 33% REDUCTION in haulage costs and an ensuing 5% cut in overall mining costs are outstanding benefits resulting from installing new 262-cu-ft steel mine cars at Inland Steel's Price No. 1 mine, Wheelwright, Ky. At the current rate of savings, Inland

How New and Old Cars Compare

Item	New Car	Old Car
Track gage	42 in	42 in
Length, coupler centers	26 ft 4 in	13 ft 8½ in
Length, body	24 ft 6 in	12 ft 0 in
Width, inside car	7 ft 11¼ in	6 ft 0 in
Height, loaded	23 in	24 in
Height, empty	24 in	24 in
Capacity	262 cu ft	90 cu ft
Min. turning radius	53 ft	25 ft
Weight	8,350 lb	3,665 lb
Type coupling	Automatic	Link-and-pin
Clearance above rail, loaded	3½ in	3¾ in
Clearance above rail, empty	4½ in	3¾ in
Number of wheels	8	4
Diameter, wheel tread	10¼ in	14 in
Diameter, wheel flange	12½ in	16⅜ in
Centers, truck and wheel resp.	21 ft 6 in	42 in
Wheel bearings	Timken roller	Timken roller
Body structure	Welded	Riveted and bolted
Live to dead-weight ratio	2.30	1.58
Cost per cu ft capacity	$6.40	$8.89
Cost per ton of raw-coal capacity	$178.40	$275.86



PAYLOAD per trip with new cars is greater. Twenty new cars carry 18 tons more than 60 old cars. Coal must be hauled as much as 12 mi and average haul is 7.5 mi. Main track is 60- and 80-lb rail laid on treated ties and ballasted with limestone.

expects to recover the investment in 2½ to 3 yr.

Inland Steel's mine management says that a number of benefits are combined to bring about these savings:

1. Safer haulage because of improved roadways and safer cars.
2. Less car-change time at the loading point and therefore less shuttle-car waiting.
3. Faster trip speeds.
4. Fewer wrecks and hence less car damage and a minimum of spillage along the haulways.
5. Lower lubrication cost, especially labor.
6. Automatic couplers, making possible more efficient assembly of trips and minimize exposure of brakemen. Elimination of sharp jerks extends the life of the cars.
7. Reduced shock and strain on the track, resulting in lower track maintenance cost.
8. Lower car-dump throughput—only 30% as many cars as before. Thus wear and tear are reduced and less power is consumed. There also is more dumping capacity because of faster automatic car feed and a larger volume of material dumped per car.
9. Lower car-parts inventory because fewer cars are in service.
10. Less track needed in the future for storing trips.

Offsetting these benefits, to a certain extent, are some problems that are inherent with the larger cars and need careful attention at all times. Other problems have come up but these are in the process of being solved by making changes in equipment. Despite the disadvantages and problems, the company reports that benefits outweigh disadvantages.

Partial loading is more serious because it results in a greater reduction in total haulage capacity than with a smaller car. Because of a threefold increase in capacity it also is more serious to have any quantity of cars idle with supplies or awaiting repairs. It is more difficult to rerail a new car. Another disadvantage is that automatic couplers also provide a poor place for brakemen to ride.

Decreased rolling friction in the new cars, lack of slack in couplers and no side sway have increased the braking problem. Consequently, an improved brake shoe, designed by American Brake Shoe Co., is now being used on locomotives because of the difficulty in stopping a trip and ensuing excessive brake wear. Because of the decreased rolling friction and braking difficulty, a need arose for a larger locomotive. To meet this need, the company has embarked on a tandem-locomotive building program in its own shop and in the near future expects to have a number of tandem units available.

What Conditions Are

Inland Steel's eastern Kentucky mines are in the Elkhorn No. 3 seam which has an average thickness of 42 in and sometimes shrinks to 28 in. Production averages 8,600 tons of raw coal per day from the Wheelwright and Price Nos. 1 and 2 mines. Coal must be hauled as much as 12 mi and the average haul is 7.5 mi; thus, round trips are as great as 24 mi.

The main haulage road consists of 60- and 80-lb rail laid on treated ties and ballasted with limestone. Grades favor the loads and are not severe because of the company grading standards. Locomotives are chiefly 6-ton units for secondary work and 15-ton for primary work, but the company now is in process of making tandem units out of the smaller locomotives to improve large-car handling.

Inland Steel acquired the property in 1930, at which time wood and steel mine cars were used at the hand-loading operation. In 1931, the company replaced these cars with 90-cu ft 4-wheel all-steel cars with link-and-pin couplings.

After the development of mobile equipment, the company converted from hand loading to mechanical loading but the basic mine car design was altered only slightly. By 1948 the company had 1,500 of the cars in service.

Shuttle cars were introduced in 1946, but coal continued to be loaded directly into mine cars as a general rule. The small cars could be fully loaded with this setup and it would have been difficult to load a

Services Modernization

Roof Control

☐ Use a systematic plan of roof support, whether bolts, timber or both; install extra support wherever doubt exists.

☐ Consider the possibilities of new forms of support or roof-strengthening, such as, bonding of strata with resin or cement.

☐ Adjust pillar size and pillaring system for good support as long as needed, and prompt, complete caving immediately afterward.

Haulage

☐ Make sure that face haulage, whether car or belt, has sufficient capacity and is sufficiently continuous to never hold up loading or mining.

☐ Automate transfer facilities and car and trip handling for minimum cost.

☐ Provide big, modern cars, with locomotives to match plus good, well-drained track, for minimum haulage labor and supply and maintenance costs.

☐ Consider belts for hoisting and for haulage, especially such new candidates as the rope and cable types.

☐ Provide dispatching and other controls for maximum haulage efficiency.

Handling Men

☐ Provide modern cars or other facilities for transporting men, including automatic elevators for hoisting and lowering in shafts, and belts or ski-tows for facilitating movement in slopes.

☐ Keep travel distance as short as possible, consistent with investment in portal facilities, by keeping portals close to the working arears.

Power

☐ Provide rated voltage at machine terminals, whether AC or DC, by keeping substations close, using ample feeder and providing a positive return of the necessary capacity.

☐ Consider the advantages of changing to AC.

☐ Provide proper protection for men, circuits and machines.

Maintenance

☐ Keep accurate records of machine condition, breakdowns and failures, and their cause.

☐ Emphasize preventive measures, including regular inspection, good lubrication and the training of foremen and operators.

☐ Overhaul components or entire machines before delays become too great and undue deterioration increases overhaul cost.

☐ Use modern alloys and materials for greater strength, longer life and greater resistance to corrosion and wear.

Pumping and Drainage

☐ Use gravity, via ditches, downward boreholes, etc., for low-cost dewatering.

☐ Keep water out by ditching, dams, flumes, etc., on the surface.

☐ Use boreholes or other means of keeping the distances short where pumping is necessary.

☐ Use plastic or aluminum pipe or thin-walled tubing with quick-acting couplings to keep down cost of materials and reduce installation labor.

☐ Automate pumping stations to cut labor cost.

Ventilation

☐ Provide modern high-efficiency fan equipment with automatic controls and indicators to save labor.

☐ Provide ample airway capacity for low velocity.

☐ Insure one-way travel to the maximum extent possible by auxiliary shafts or openings at intervals.

☐ Keep airways clean and straight for low resistance.

☐ Prevent air loss by sealing stoppings and using plastic or other modern materials for temporary stoppings. The latter also save labor.

☐ Provide positive direction of the air to the face.

Supplies

☐ Control inventory for minimum investment consonant with good service.

☐ Mechanize receipt, storage and delivery of supplies for minimum labor.

☐ Protect supplies in the warehouse and on the section to prevent damage and loss.

☐ Make sure that the supply-delivery system provides the necessary items in the necessary quantities at the right places at the right times.

For complete data on these and other services, including basic principles and the latest in equipment and methods, see the Coal Age Mining Guidebook, published in Mid-July, 1958.

Change motors in minutes—

with FALK *all-steel* MOTOREDUCERS



No long and costly "down time" involved

Motors can be interchanged or replaced *in minutes* with the all-steel, All-Motor type FALK Motoreducer. No long and costly "down time" is involved in making the change!

Best of all, replacement is not limited to original make of motor—new NEMA frames may be substituted for old. This versatile Motoreducer operates with any make, speed or type of standard foot-mounted motor within its AGMA rating. No modification, no special shaft, no "partial" motor required.

In addition to unmatched motor interchangeability, this dependable gear drive—the "work horse of industry"—offers: widest choice of output-shaft position (horizontal, vertical, right-angle)...any output-shaft connection...any mounting, including wall and ceiling...standard speed range from 1.5 rpm to 1430 rpm. All these advantages, plus proved efficiency, low maintenance and extra-long life, make the All-Motor type FALK Motoreducer your best buy for any job requirement.

Furnished in sizes up to 75 hp with any make, style or type of motor; or, *without a motor if desired.* FALK Motoreducers are available from convenient factory, field or distributor stocks, from coast to coast.

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FALK "IN-BUILT" FACTORS assure full dependability—better service—longer life



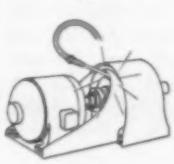
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Large shafts, oversize bearings...rigid mountings with wide bearing spans to handle maximum loads.



PRECISION GEARING
Heat-treated alloy steel gearing, precision cut and shaved after heat treatment to eliminate distortion.



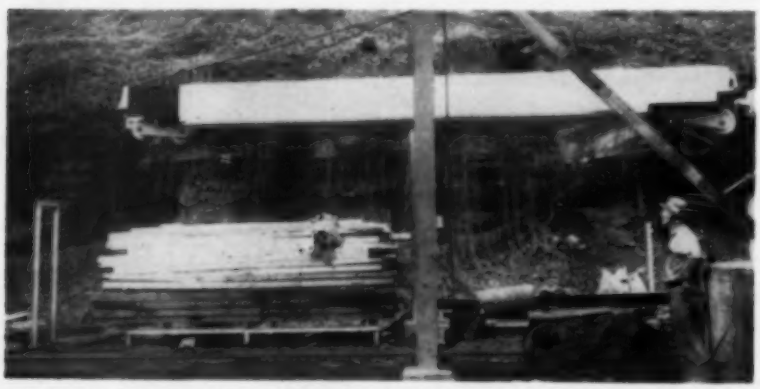
SEALED HOUSINGS
Splashproof, dustproof, oiltight. Dual closures and one-way vents keep oil in, dust and moisture out.



NEW DUMP, electronic scales and car feeder simplify operation of headhouse. Weighing is coordinated with duties of dump operator. Hood and fan remove dust.



TANDEM LOCOMOTIVES, built in company shop, are latest step in the company's program to improve haulage efficiency. Units are needed for braking on downgrade.



100-MILLIONTH TON of steel produced by Inland Steel went into fabrication of this car, shown being lowered to mine track for delivery to underground sidetrack.

larger car in the limited height. As progress was made in equipment for thinner seams the company realized that continuing to load directly into mine cars was too expensive because the payload per car from the mechanical loading sections was reduced and mining efficiency suffered.

When Inland converted to full shuttle-car face haulage and established track loops in the sections the anticipated need for the larger mine cars was confirmed. This prompted the company to make an analysis of the haulage system, including a comparison of the old mine car with a new mine car to be used at Price No. 2 mine. This mine was chosen because it was new, small and was in thin (34-in) coal. It represented, to a large degree, the conditions the company could expect in the future.

Selecting A Car

In selecting a new car, Inland wanted one that would fit best in the thin seam and the present haulage layout, and still be as long as possible. After careful consideration of all factors the company selected an 8-wheel 24-in high 262-cu ft Differential car equipped with Willison automatic couplers. Seventy of the cars were delived to Price No. 2 mine in March, 1954, where they were carefully studied. Improved haulage, better coordination with face operations and greater safety soon became apparent and the car design sold itself to management.

The benefits resulting from the new cars at Price No. 2 plus the fact that 660 old cars at Wheelwright and Price No. 1 mines were more than 20 yr old, and others were approaching that age, prompted management to study the possibility of replacing all old cars with new, larger units. A committee of mine officials took on the task of determining if new cars would pay for all mines and, if so, what type of car should be chosen. It took the committee only a short time to decide that the new cars would pay their way, so they immediately concentrated on selecting a specific car.

Although they gave consideration to a higher car than the one already in use at Price No. 2, the committee decided that it would be better to widen the present haulways than to take roof or bottom to provide clearance. Consequently, they recommended the same car as in service at Price No. 2. Engineering studies showed that 505 new cars could do the same job as 1,500 older units.

As soon as the purchase of the new cars was approved, preparation work began so that a smooth changeover from old to new cars could be made during the miners' vacation in 1957. The preliminary work included:

1. Setting new projection standards and then advancing new entries accordingly.

2. Installing No. 3 turnouts in place of No. 2s.

(Continued on p 114)



What this tag on OKOCORD portable cords and cables means to you

This "QC" (Quality Control) tag, the final one of a series, is Standard Operating Procedure for every length of OKOCORD **before** it is shipped out to you. It's your assurance that Okonite's modern equipment, skilled craftsmanship and overall Quality Control program combine to build more value into OKOCORD portable cords and cables.

Here are six other steps, typical of all OKOCORD manufacturing operations, where quality is constantly checked and maintained by the Quality Control Lab and every operator and supervisor in the plant.

1. **QC Lab tests copper rod, raw materials against Research-developed standards to maintain uniform, high quality.**
2. **Strands are continuously drawn, annealed and steam cleaned with every run passed for size, strength, flexibility.**
3. **Compounds are mixed, milled, strained and refined in a continuous mechanized sequence to help eliminate error.**
4. **Microscopic examination of compound batches, in addition to physical and electrical tests, checks particle dispersion and authenticates compounding.**
5. **Latest type of continuous lead extruder eliminates damaging press stops in applying continuous mold for vulcanization—guarantee of OKOCORD's "tire-tread" toughness.**
6. **Okonite QC imposes the most rigorous tests in the industry, in process and final.**

Each reel of OKOCORD bears this quality control tag. It's your assurance that the OKOCORD you buy will be a long-term investment. The Okonite Company, Passaic, N. J.

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Write for this newly-published 64-page catalog on OKOCORD. Full information on construction components, cable assemblies, dimensional tables, engineering data plus splicing and terminating drawings and instructions.



where there's electrical power . . . there's **OKONITE CABLE**

6379



BEFORE new large mine cars were installed, shale roof was supported by steel bars held up by two wood posts.



TODAY'S HAULWAY is wider to accommodate new cars, has expansion-type roof bolts instead of crossbars for support.



REMODELED HAULWAY in areas where heavy roof support is needed looks like this. New support includes steel channels held in place by four roof bolts.

3. Providing proper clearance for the wider cars.

4. Retimbering, installing bolts and channels for permanent support in main haulways.

5. Installing automatic couplers and adapters for link couplers on all locomotives.

6. Changing pole bases on locomotives and repositioning trolley wire.

Delivery of the new cars began in March, 1957, and was completed by July. As cars arrived they were unloaded and taken underground and stored in idle areas. By vacation time most of the underground preparation work was completed, leaving only conversion of the headhouse as a major job for the vacation period.

The miners' vacation period extended from June 26 to July 8 but the company suspended operations for a total of 3 wks to complete the work at the headhouse. This included installing a new car dump, Streeter-Amet electronic scales, Link-Belt car feeder and coal recovery equipment in the screen house. All work was completed on schedule and production was resumed on July 19.

Today's Haulage

The new mine cars carry a payload of 9.6 tons compared to 2.9 tons for the old cars. Coal is hauled in 20-car trips and the payload is 192 tons. In the past, coal was hauled in 60-car trips and the payload was only 174 tons. Thus with an output of 8,600 tons of raw coal and rock per day from the Wheelwright and Price No. 1 mines, the number of trips is cut to 40.4 from 44.5, or a reduction of 4.1 trips per day.

An added dividend from the new cars is elimination of the need for assembling trips on the off shift. This saving is possible because more productive work is realized from the haulage crews on production shifts.

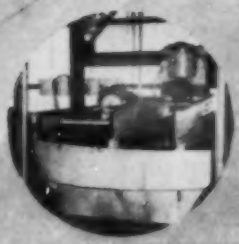
The new electronic scale at the headhouse is designed so that coal weighing can be coordinated with duties of the dump operator. He now is able to weigh coal, record where the coal comes from and operate the dump.

The design of the interior of the old cars caused coal to cling in various places. As a result one man spent a major portion of each shift at the headhouse cleaning the cars. This car-cleaning problem is not encountered with the new cars.

Lower maintenance cost also is noted not only because the cars are new but also because of improved roadability which has cut derailments to a minimum. Consequently, car damage also is at a minimum. Because of the smoother operation of the cars, spillage is negligible. In fact, the company points out that 650 fewer manshifts of track cleaning were needed in a 7-mo period with the new cars. Another money-saving benefit from smoother operation is that less coal dust is thrown into suspension to settle on rockdusted surfaces. Thus rockdust remains effective for a longer period and the company used 200 fewer tons of rockdust and saved 90 manshifts over this same 7-mo period.

ENGINEERED • CONSTRUCTED AND EQUIPPED





WILMOT HYOROTATOR
CLASSIFIER FOR
PREPARING 1/8"x 0

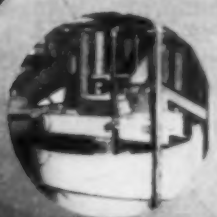
FOR THE COAL PRODUCTION OF THE FUTURE

JEDDO HIGHLAND'S

Midvalley FINE COAL PLANT



WILMOT FROTH UNIT
FOR PREPARING 20 M x 0



WILMOT HYDROTATOR
FOR PREPARING 2" x 0



By

WILMOT

ENGINEERING COMPANY, WHITE HAVEN, PA.



NEW FINE-COAL PLANT is fed raw silt carried from basin deposits in twin-powered scraper. Primary scalping is done in building at left foreground and feed for main plant is pumped with 2,160 gpm of water to top of circuit.

Jeddo-Highland Fine-Coal Plant Opens New Market Opportunities

Fine anthracite for metallurgical and power-generation uses is recovered from silt deposits. Tabling, classifying and flotation with cyclone thickening are main cleaning processes employed at new $650,000 facility.



TWIN-POWERED SCRAPER hauling 25-ton load of silt makes seven trips per hour over average haul distance of 1,700 ft from basin to plant.

MODERN FINE-COAL PREPARATION equipment is making it possible for Jeddo-Highland Coal Co. to participate in increasing measure in a growing industrial market for the fine sizes of anthracite. A new plant, designed by Jeddo-Highland's coal preparation and mechanical engineering departments in cooperation with officials at Wilmot Engineering Co., is situated at Wilburton, Pa., on the foundations of the company's old Midvalley Colliery preparation plant. The old plant was dismantled to make room for the new one which was erected under the supervision of Wilmot Engineering.

The new Midvalley plant is the latest demonstration of the progressive management Jeddo-Highland has enjoyed throughout its existence. The company this year celebrates its 100th anniversary as a producer of premium anthracite.

The new facility represents a total investment of $650,000, and it follows by only a few years the erection of another fine-coal plant *(Coal Age,* November, 1954, p 96) near the company's headquarters at Jeddo, Pa.

Immediately adjacent to the plant

are silt deposits—the solids from the waste water of the former plant—which have been collected over a period of 52 yr. There is a sufficient quantity of this silt in the area to supply the new plant for at least 10 yr at the design feed rate of 150 tph. Jeddo-Highland has steadily increased its sales of fine anthracite for use in power generation, as an additive to bituminous coal in coking blends and in the sintering of metallurgical ores. The new plant will make it possible for the company to offer still greater tonnages of these fines in the years immediately ahead.

The first step in the planning for the new plant was to make a thorough sampling of the silt deposits in the area. Sizing and washability studies were conducted and the data from these formed the basis for plant design by Wilmot Engineering Co. The main basin contains silt to a depth of 75 ft in some places. The quality of the silt is not uniform throughout the basin. A natural classification by size and specific gravity took place as the waste water was run off into the basin during the operation of the old cleaning plant. High ash material dropped out of the stream first, then farther out the lighter particles and lower ash material were precipitated and at the outer limits the very fine sizes finally settled. These fine sizes at the outer limits consist of "liver" which is a consolidation of the finest sizes into a mass which is difficult to break up.

Blending Plant Feed

One of the early problems that had to be solved was how to recover this naturally classified material so that it could be fed to a plant in a blend that would contain all these three types of raw materials as a uniform feed. A loading shovel and truck haulage were considered but the difficulties in providing uniform feed ruled out this possibility. A second possibility was the use of a mother belt with laterals but again the problem of producing a uniform feed interfered and furthermore the ramp under the main belt would then have to be recovered as a final stage.

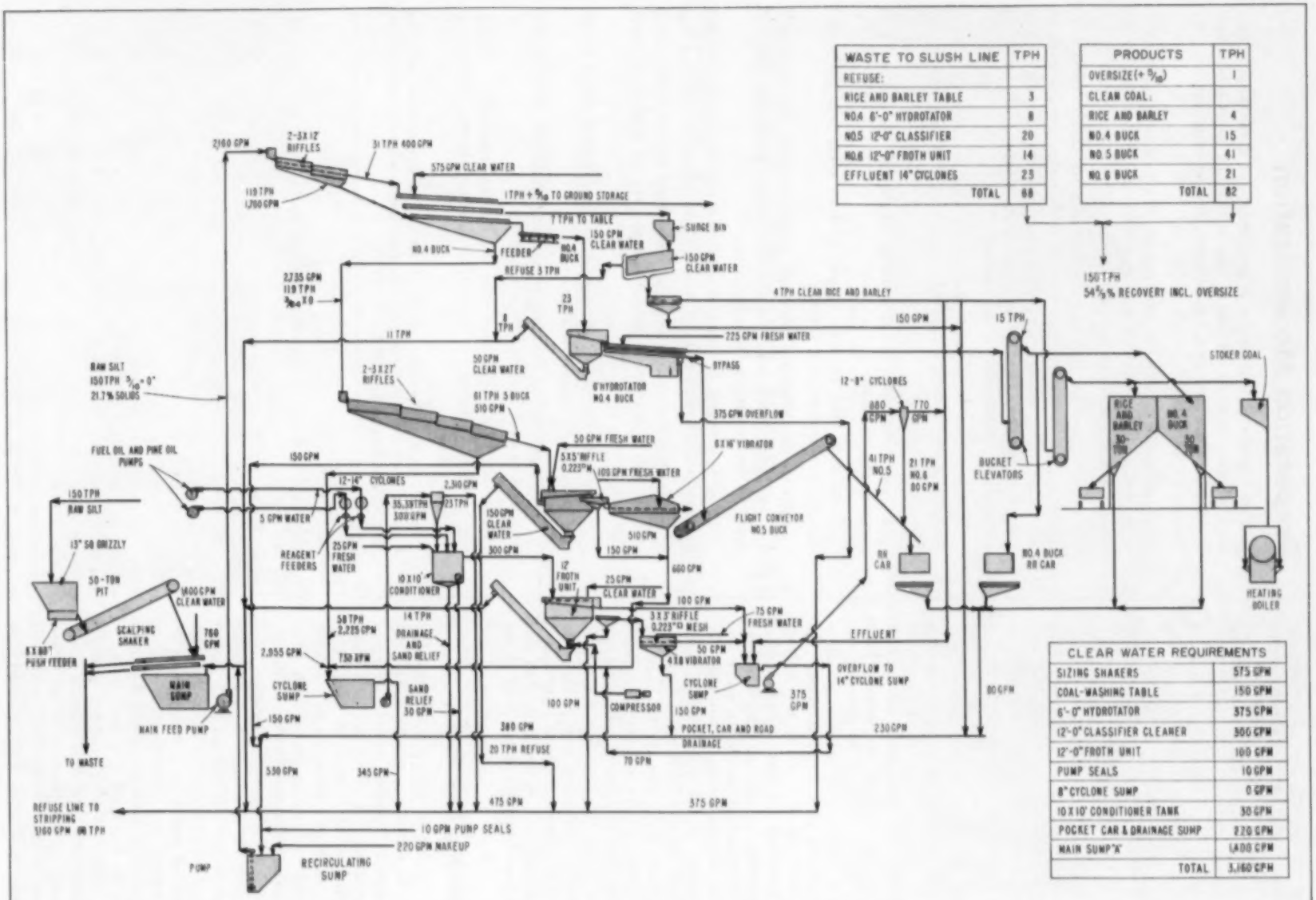
After surveying a number of similar possibilities the final solution developed by the planners of the project was to use a tractor-drawn scraper to pick up a blend of the material from the different zones of the silt deposit. The unit chosen for the job was a Euclid Model TS-24 twin power scraper, capable of carrying a load of 20 to 25 tons of silt with sideboards in place. A D-8 bulldozer was assigned to the pit to push the scraper to increase its loading rate, when necessary. The outcome is that two men and two machines now provide the total feed to the plant. The scraper is equipped with two engines, one in the tractor rated at 300 hp at 2,000 rpm and one at the rear of the scraper, rated at 218 hp at 2,100 rpm. Average haul distance is 1,700 ft and the scraper makes an average of 7 trips per hr from the silt basin to the plant feed hopper.

The sizes prepared in the plant include Rice, Barley, Buckwheat No. 4 and Buckwheat No. 5 and a finer coal product designated as Buckwheat No. 6. The Rice and Barley sizes are cleaned on a Deister coal washing table; No. 4 is cleaned in a Wilmot hydrotator; the No. 5 in a Wilmot classifier; and the No. 6 in a Wilmot froth unit. The feed and product of the froth unit are thicken-

Preparation Modernization

- ☐ Provide storage, if space is available, for a reasonable tonnage of raw coal to minimize the effects of mine and plant stoppages. Consider also the merits of raw-coal mixing and blending facilities.
- ☐ Clean mechanically for efficient impurity removal and maximum uniformity—but do not run cost up unnecessarily by going beyond good market standards.
- ☐ Insure maximum recovery by use of automatic controls on cleaning equipment, retreatment of middlings, and salvage of coal from wash water, dust collectors, mine refuse, pickings and, if necessary, reject from the main cleaning unit—in all instances if economically warranted.
- ☐ Preserve size value and realization and increase consumer acceptance by accurate screening on high-capacity low-maintenance equipment.
- ☐ Promote consumer acceptance by drying to cut moisture to a practical minimum.
- ☐ Treat coal and remove tramp iron to eliminate dust and trouble in the consumer's plant.
- ☐ Provide facilities for recovering and treating fine coal, and for clarifying wash water to prevent stream pollution, plus, if possible, recovering salable material.
- ☐ Provide storage, if space is available, for prepared sizes for greater flexibility in mine operation and sales.
- ☐ Provide sufficient testing and laboratory facilities for accurate records for control purposes and data on quality of shipments.
- ☐ Install automatic or semiautomatic equipment units wherever possible to conserve manpower.
- ☐ Use long-wearing corrosion-resistant materials to cut downtime and reduce maintenance expense.
- ☐ Consider, in designs for new plants, the possibility of adding to basic facilities or installing new processing circuits at a future date.

For a complete discussion of all phases of coal preparation, including basic principles and the latest in equipment and methods, see the* Coal Age *Mining Guidebook, Mid-July, 1958.

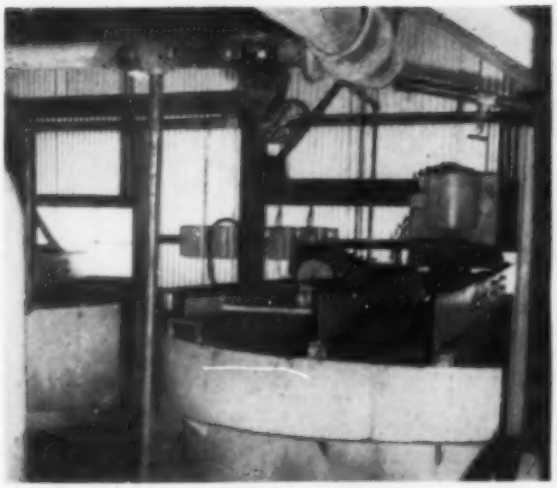


WASTE TO SLUSH LINE	TPH
REFUSE:	
RICE AND BARLEY TABLE	3
NO.4 6'-0" HYDROTATOR	8
NO.5 12'-0" CLASSIFIER	20
NO.6 12'-0" FROTH UNIT	14
EFFLUENT 14" CYCLONES	23
TOTAL	68

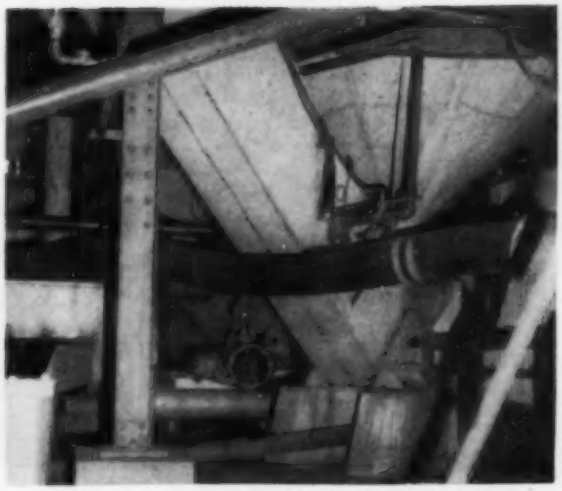
PRODUCTS	TPH
OVERSIZE(+ 5/10)	1
CLEAN COAL:	
RICE AND BARLEY	4
NO.4 BUCK	15
NO.5 BUCK	41
NO.6 BUCK	21
TOTAL	82

150 TPH
54 4/5 % RECOVERY INCL. OVERSIZE

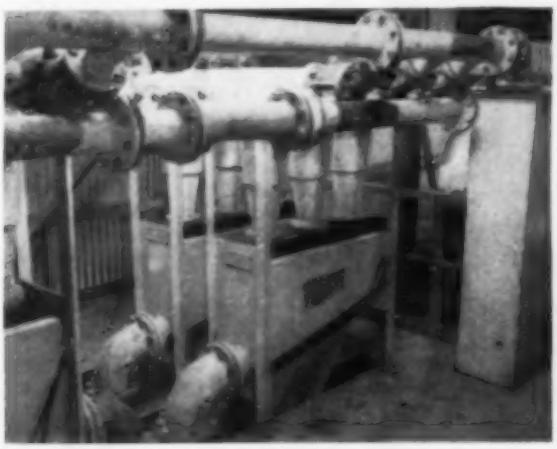
CLEAR WATER REQUIREMENTS	
SIZING SHAKERS	575 GPM
COAL-WASHING TABLE	150 GPM
6'-0" HYDROTATOR	375 GPM
12'-0" CLASSIFIER CLEANER	500 GPM
12'-0" FROTH UNIT	100 GPM
PUMP SEALS	10 GPM
8" CYCLONE SUMP	0 GPM
10 X 10' CONDITIONER TANK	30 GPM
POCKET CAR & DRAINAGE SUMP	220 GPM
MAIN SUMP "A"	1,400 GPM
TOTAL	3,160 GPM



FROTH UNIT (left) cleans No. 6 Buckwheat (48x100-mesh) and No. 5 coal is cleaned in 12-ft-diameter fine-coal classifier.



AUTOMATIC REFUSE-DISCHARGE CONTROLS improve performance of cleaners. Compressor furnishes flotation air.





BANKS OF CYCLONES (left) and stationary launder screens (right) are employed to condition the stream of solids-and-water at various steps in the cleaning process. Both types of units aid in concentrating and disposing of high-ash extreme fines.

ed and deslimed in banks of Heyl & Patterson cyclones, as explained later in the following description of plant circuits.

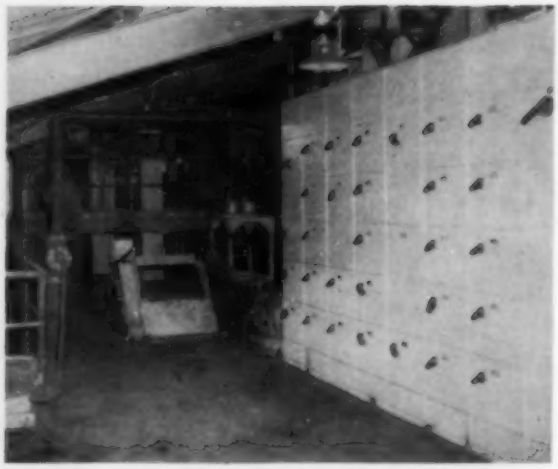
Preparation Circuits

The raw silt is dumped from the Euclid scraper into a 50-ton main feed hopper, covered by a grizzly with 13-in square openings which screen out large tramp rock and other debris. A push feeder at the bottom of the pit feeds the raw silt into a flight conveyor which elevates the material to a double-deck scalping shaker housed in a separate building. At that point 1,400 gpm of water are added to fluidize the silt. The double-deck shaker removes the plus 5/16-in material which is immediately rejected. The underflow of the double-deck shaker passes directly into the main feed sump, where an additional 760 gpm is added. The mixture from this sump, containing 21.7% solids, is pumped to the top of the main preparation plant with the 2,160 gpm of water.

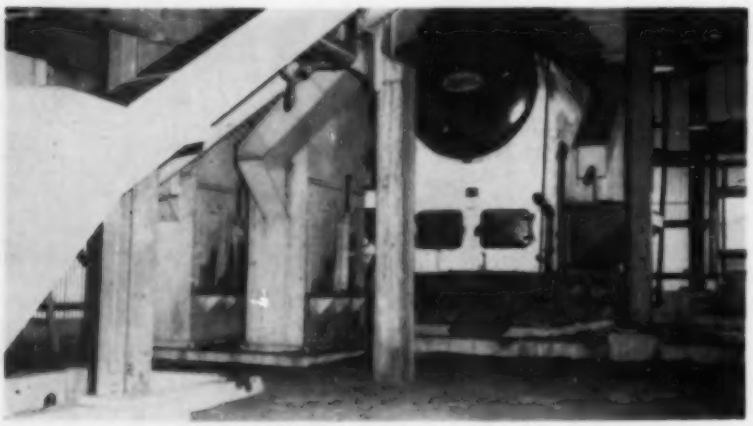
At the top of the plant the feed is split into two streams which pass over two parallel Wilmot step launders or riffles. These launders are 3 ft wide and 12 ft long and are dressed with 0.060- and 0.055-in square-mesh stainless steel cloth. Overflow of these launders at a rate of 31 tph is discharged to a 3-deck shaker. The top deck removes oversize (plus 5/16 in), passing it to ground storage for later cleaning at another Jeddo-Highland plant. The middle deck removes Rice and Barley sizes to provide feed for the Deister table. The lower deck removes Buckwheat No. 4 which is then carried by an Ajax vibrating chute to the hydrotator.

The cleaned Rice and Barley sizes are dewatered by a 4x8 ft Seco dewatering vibrator and then carried by a bucket elevator either to storage in the loading pockets or to the hopper of the plant heating furnace. Either trucks or railroad cars may be loaded from the clean coal pockets, since a plank roadway has been built on the loading track up to the levels of the rails. The underflow of the primary launders and the 3-deck shaker are passed over two other Wilmot step launders. These launders are 3 ft wide and 27 ft long; the first 9 ft being dressed with 0.035-in square-





CENTRALLY-LOCATED PUSH-BUTTON STATION above main machinery deck permits operation of all units by one man. Unit-type control panels are housed at one point for better maintenance and faster troubleshooting.



PLANT HEATING SYSTEM includes two 7-ft stokers under low-pressure boiler. Fuel is diverted from one of two bucket elevators shown at left.

Operating and Engineering Officials

Jeddo-Highland Coal Co.

President ..... Donald Markle
Executive Vice President ..... Wilmot C. Jones
Vice President and General Superintendent ..... Donald Markle Jr.
Superintendent of Preparation ..... E. M. Robinson
Mechanical Engineer ..... J. J. Halpin
Electrical Engineer ... O. E. Kenworthy

Midvalley District

District Superintendent ..... Michael Waskovich
Electrical Foreman .. Daniel O'Donnell
Outside Foreman ..... Harry Stibitz

mesh stainless steel cloth and the next 18 ft with 0.0223-in square-mesh stainless steel cloth. The launders remove 61 tph of Buckwheat No. 5 feed (minus 3/64 in x 48 mesh).

This overflow material then is fed into a 12-ft-diameter Wilmot classifier. The clean product is dewatered on a 6x16-ft Allis Chalmers Low-Head vibrator. The underflow of the parallel 27-ft launders and the underflow of the 6x16 ft vibrator, minus 48-mesh material, flows into a collecting sump at a rate of 58 tph, solids. The material from this sump then is pumped to a battery of twelve 14-in Heyl & Patterson cyclones for thickening and desliming. The underflow of the cyclones, 35 tph of minus 48x100-mesh material, flows into a 10x10-ft conditioning tank which precedes the flotation process.

Cyclone Thickening

Fuel oil and pine oil are added in the conditioner to prepare the material for flotation. The overflow of the conditioner flows into the 12-ft-diameter Wilmot froth classifier with more of the reagents being added at this point. The clean product removed through the lower collecting pipes of the froth classifier passes over a short Wilmot launder 3 ft wide and 3 ft long for partial dewatering and desliming. The overflow of this launder then passes over a 4x8-ft Seco vibrator. The product of the vibrator and the main overflow of the froth unit are combined in a collecting sump from which the material is pumped to a battery of twelve 8-in Heyl & Patterson cyclones for dewatering and thickening.

Underflow of the cyclones, which is clean No. 6, is loaded directly with the No. 5 clean coal.

The overflow of the 8-in cyclones, containing very little in the way of solids, is returned to the feed sump of these same cyclones for recirculation. The overflow of the 14-in cyclones, containing a high percentage of minus 100-mesh high-ash material, is combined with refuse from the main cleaning units and sluiced to an impounding basin as refuse.

The new plant began full-time operations at the end of July, 1958. At the time the plant was visited, E. M. Robinson, superintendent of preparation, and J. J. Halpin, mechanical engineer, were actively engaged in gathering performance data, the first of which appears in the column on the facing page.

Midvalley Performance

Feed to Plant

Sizing	Wt., %	Ash, %
Plus 3/16	0.80	14.4
Plus 3/32	1.70	15.3
Plus 3/64	14.00	14.1
Plus 35 M	30.70	15.8
Plus 48 M	14.40	20.8
Plus 60 M	4.90	26.8
Plus 80 M	9.00	34.4
Plus 100 M	3.80	44.4
Minus 100 M	20.70	53.7
	100.00	27.4

Barley—Rice Coal

Sizing	Wt., %
Plus 5/16	2.7
Plus 3/16	38.8
Plus 3/32	52.4
Minus 3/32	6.1
	100.0

Total Ash—10.2%

Straight Buck No. 4

Sizing	Wt., %	Ash, %
Plus 3/32	3.6	6.4
Plus 3/64	83.2	9.9
Plus 35 M	12.4	11.0
Plus 48 M	0.4	11.9
Minus 48 M	0.4	17.4
	100.0	9.9

Buck No. 4 Refuse 66.0% Ash

Buck No. 4 Undersize with No. 5

Wt., %	Ash, %
0.6	7.1
65.2	11.0
33.2	11.6
0.6	11.9
0.4	22.8
100.0	11.2

Buck No. 5 from Classifier

Sizing	Wt., %	Ash, %
Plus 14 M	0.2	7.5
Plus 20M	21.4	8.5
Plus 40 M	59.8	10.5
Plus 60 M	14.2	14.0
Plus 80 M	2.8	21.7
Plus 100 M	0.6	31.4
Minus 100 M	1.0	43.3
	100.0	11.3

Refuse 62.3%

Buck No. 5 & No. 6 from RR Car

Wt., %	Ash, %
1.2	
11.2	8.4
53.6	
22.0	
4.4	13.8
2.0	
5.6	33.5
100.0	11.3



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There's more to look for in Ford's extra heavies for '59

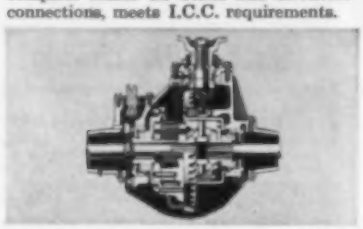
Ford Extra Heavies have proved themselves on every kind of job—you can count on them for *dependability* and *durability*. And in '59, you get high performance at low Ford prices for brand-new reasons! New faster rear axle ratios, new higher capacity axles, and other important options make big-truck operation still thriftier in '59 when you go *Ford*-ward. Send coupon for full information!



NEW Tractor Equipment Package provides complete trailer air brake and electrical connections, meets I.C.C. requirements.



NEW Ford Tilt Cab Tandems are available with three tandem-axle capacities: 28, 34, and 38,000 lb. Front axles to 15,000 lb.



NEW Faster Axle Ratios team up with Super Duty V-8's for greater gas economy and reduced engine wear. For example, 5.43/7.39 to 1 available in 1100 Series.



NEW 2-Shoe Brake (parking) is standard for '59 on all Ford Extra Heavies. Has 50% greater stopping and holding power, requires 50% less effort to operate.



Tilt Cab Tandem Ford C-950 (above) has hydraulic loader with push-button remote control.

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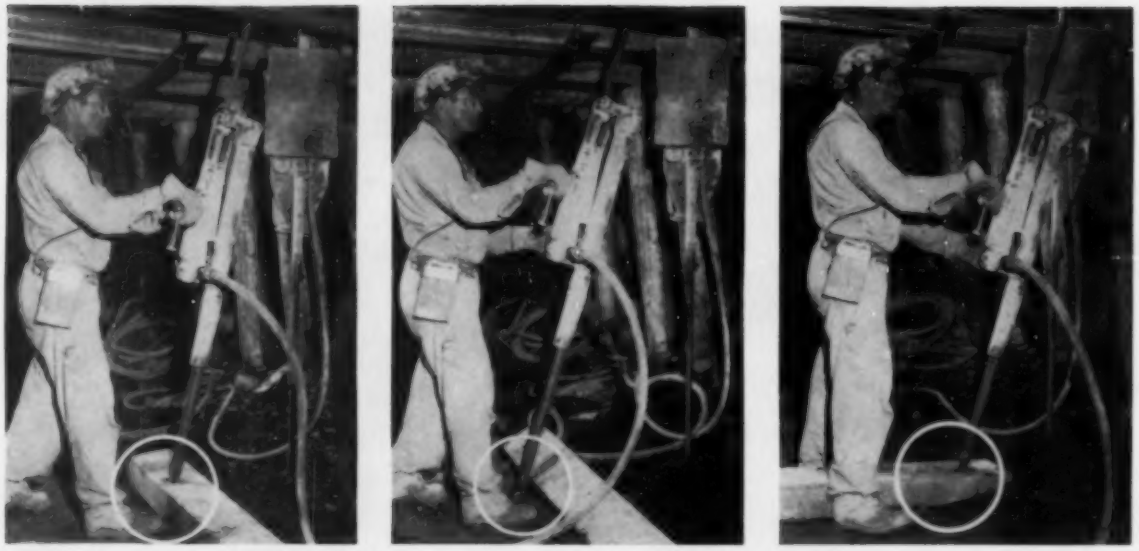
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BRAND-NEW TILT CAB TANDEM FORDS for '59 combine the easier, more economical maintenance of tilts with high tandem-axle load capacities. Tilt design also permits higher front axle loads, longer body on given wheelbase. C-950 Tandem, above, operated by Fairlawn Supply and Concrete, Akron, has 15,000-lb. front axle, 34,000-lb. rear. Carries up to 6,500 brick, compared to 5,000 on a conventional tandem. Has 401-cu. in. V-8, 5-spd. main transmission, 3-spd. auxiliary, 201-in. wb. GCW (with pup trailer) 72,000 lb.

COST LESS ... *less to own ... less to run ... last longer, too!*



SERIES of photographs sometimes is used to show preventive measures. Left photo is before accident happened, center picture shows how man was injured and right shows how job should have been been done to prevent accident.

Accident-Scene Photographs:



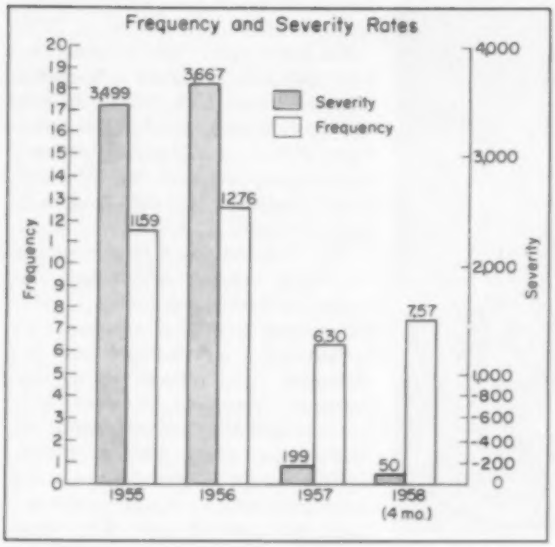
CF&I PHOTOGRAPHER, David Roscover, travels to mine in station wagon loaded with safety clothing and camera.



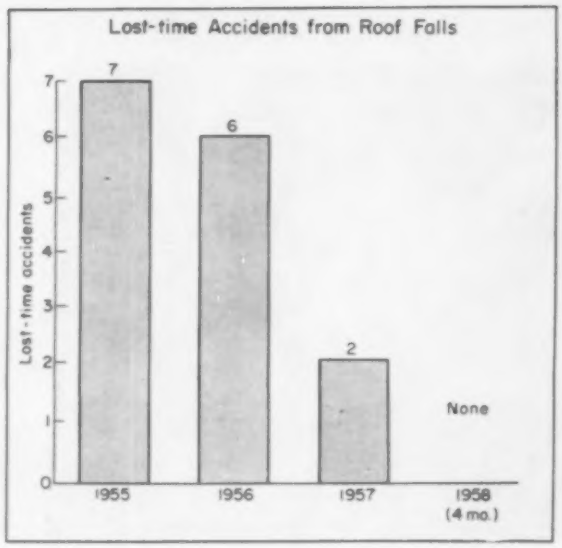
RECONSTRUCTING ACCIDENT are F. S. Leonard, safety engineer (center); Tony Pagnotta, foreman (right); and model.

Photographs of reconstructed accidents, taken by company photographer immediately after accident, are used in monthly safety bulletins and displayed on bulletin boards to bring safety message home to workers. Result of new approach is a significant decrease in frequency and severity rates because of better communication between company and employees.

"COMPLETE UNDERSTANDING between management and employees has been our goal for a long time, especially in matters of safety. Communication with the employee has taken many forms in the past, all of which have contributed to a desire to work safely. Today, with the aid of photographs of accident scenes we are getting better results than ever," says Francis Leonard, chief coal mine in-



EXCEPTIONAL IMPROVEMENT in severity rate is noted in past 1½ yr. Use of photographs is believed to be major factor.



ROOF-FALL ACCIDENTS also have been cut significantly in past 1½ yr. None has occurred thus far in 1958.

Effective New Tool in Safety Drive



HOW accident happened is photographed from best possible angle so employees can analyze it for themselves.



WAYS to eliminate accident are discussed by officials and mine safety committee after accident scene is photographed.

spector, Colorado Fuel & Iron Corp., Pueblo, Colo.

Since March, 1957, CF&I has adopted a new approach to accident prevention by reconstructing as nearly as possible the conditions at the time of an accident and then taking a series of photographs. The company tries to obtain the best angle in taking the pictures so that on viewing them employees can practically analyze the accident for themselves. Mr. Leonard explains that the company's aim is to have the photos show the facts of the accident. There is a personal touch to the pictures. The equipment and the settings in the photographs are familiar to mine employees as well as the person acting the role of the victim.

Effectiveness of the new approach shows up in the sharp improvement in the company's safety record since the method has been in effect.

Photo Results

The past 11 yr has seen a consistent and substantial reduction of injury rates, but the greatest reduction has been during the period since the photographs have been used. For example, there were twenty-three lost-



HANDLING MATERIALS and operating machines are jobs where CF&I accidents occur. Company believes human failure plays role. Photos carry safety message.



HAULAGE ACCIDENT, result of failure to observe block signal, caused bruised back to worker thrown from cab. Reconstructed accident is being photographed.

time accidents at CF&I coal mines in 1955, twelve in 1957 and three in 1958 through April 30, 1958. Frequency was 11.59 in 1955, 6.30 in 1957, and 7.57 through April, 1958. Severity dropped from 3,499 in 1955 to 199 in 1957 and to only 50 through April, 1958.

In August of this year 1,500 employees of CF&I coal mines and Sunrise iron mine received Joseph A. Holmes honor certificates for working nearly 8 million fatality-free man-hours. The national awards also were made to each mine force and to the Colorado Fuel & Iron Corp.'s mining department.

An average of 600 miners at Frederick mine worked 1,425,768 man-hours without a fatality from Sept. 6, 1956 to Mar. 1, 1958, to earn the certificate for the employees and management of that mine. The employees and management of Allen mine were awarded certificates for working 3,060,269 man-hours, Dec. 23, 1953, to Mar. 1, 1958, without a fatality. During the period, an average of 550 miners produced 2,276,637 tons of coal.

For many years CF&I's mining department has published a monthly safety bulletin, which contains records of frequency and severity rates, man-hours worked, number of surface and underground accidents and other statistics pertinent to the company's safety program.

The main feature of the bulletin is that each lost-time accident is described and recommendations or rules for preventing similar accidents are included. For a long time these descriptions were supplemented by sketches attempting to show how the accidents occurred and conditions in the area where they happened. Sometimes these sketches were not satisfactory because the average miner could not interpret them. They were difficult to make and required a lot of time.

Later, the company attempted some perspective drawings, including the figures of men and machines. These illustrations proved a bit more enlightening to the average worker, but they still left much to be desired. Furthermore, some of these drawings required lengthy descriptions to make them clear.

How Photos Are Used

Recognizing that people learn more through sight than through any other sense, the company decided early in 1957 to try a new angle in promoting safety: that is, to take photographs of the scenes and conditions immediately after accidents occur and publish them in the safety bulletin. The purpose is to show as nearly as possible the conditions at the instant the accident happened.

The company writes up a complete description for each accident, but in most instances anyone can determine exactly how it happened from looking at the photograph. Sometimes a series of pictures is used to show proper preventive measures. For example, a typical series would include scenes before the accident, after the accident, and how the job should have been done.

Photographs frequently are used in discussions with CF&I joint mine safety committees. Each accident is studied by the committee for the mine and recommendations are made and carried out to prevent similar accidents in the future.

The two most frequent accidents at CF&I mines in the last 2 yr are not falls of roof and haulage, but handling tools or operating machines. This leads the company to believe that direct failure of the individual is responsible for the majority of the accidents. As a result, the company is bending every effort to contact each employee individually by various means. Photographs of accident scenes are helping in this work.

Mr. Leonard points out the communication is a two-way proposition and no matter how hard one tries to put over a point, the effort is wasted if there is no response from the other side. He notes that CF&I is getting response from the men when they observe the accident photographs. The men promptly point out the cause of the accident and suggest corrective measures, some of which prove valuable to the company's safety program. Men who work in the various jobs are the ones who really know how the work should be done and make many useful suggestions. But even though a man may know how a job should be done, Mr. Leonard notes that it is not easy to get him to do things properly at all times. Nevertheless, this is the company's goal and more and more of the employees are accepting their responsibilities in doing their jobs the right way and the safe way.

Safety Modernization

☐ **Make safety a definite part of the operating function and make one official or department definitely responsible.**

☐ **Emphasize safety in mine and plant design, including bleeders, emergency escapeways, provisions for fire-fighting, etc.**

☐ **Put roof support at the top of the list and haulage second in the attack on physical hazards. Rock dust to the face, provide plenty of air and use approved equipment as the major explosion defenses. Keep mine and plant clean, clear of obstructions and hazards, and well lighted; keep all equipment in good repair.**

☐ **Employ all the accepted personnel-protection facilities, including goggles. Provide necessary emergency equipment, such as, self-rescuers.**

☐ **Establish a program of regular inspection, reporting and followup to uncover and eliminate hazardous conditions and practices.**

☐ **Train management and men in accident prevention.**

☐ **Develop safety rules to supplement codes and laws and insist on compliance.**

☐ **Keep interest alive by incentives and by such varied approaches as contests, meetings, letters, bulletins, membership in safety organizations and so on.**

For a complete discussion of all phases of safety, including basic principles and the latest in equipment and methods, see the* Coal Age *Mining Guidebook, Mid-July, 1958.

How Photographs Are Made

All lost-time and fatal accidents are photographed by either or both of the CF&I *Blast* Publicity Dept.'s industrial photographers. The *Blast* is CF&I's employee publication. Head photographer for the department is Franklin Sluder, who has been with CF&I for 13 yr in this capacity. David Roscover, with 8 yr of service, is photographer and darkroom technician. All negatives are processed and all pictures printed in the department's well-equipped darkroom.

When an accident occurs, the superintendent of the mine (Frank Bennett at Frederick mine, Valdez, Colo. and Lloyd Ingles, at Allen mine, near Weston, Colo.) wires the offices of CF&I's mining department at the Pueblo plant and tells the day and hour the accident will be investigated. The mining department then contacts the managing editor of the *Blast* and makes an appointment for a photographer to be on hand. Mr. Sluder usually makes the trips to film the reconstructed accidents, but in case of vacation or previous appointments Mr. Roscover is assigned the job. Occasionally, both photographers and sometimes a photographer and a reporter will make the trip.

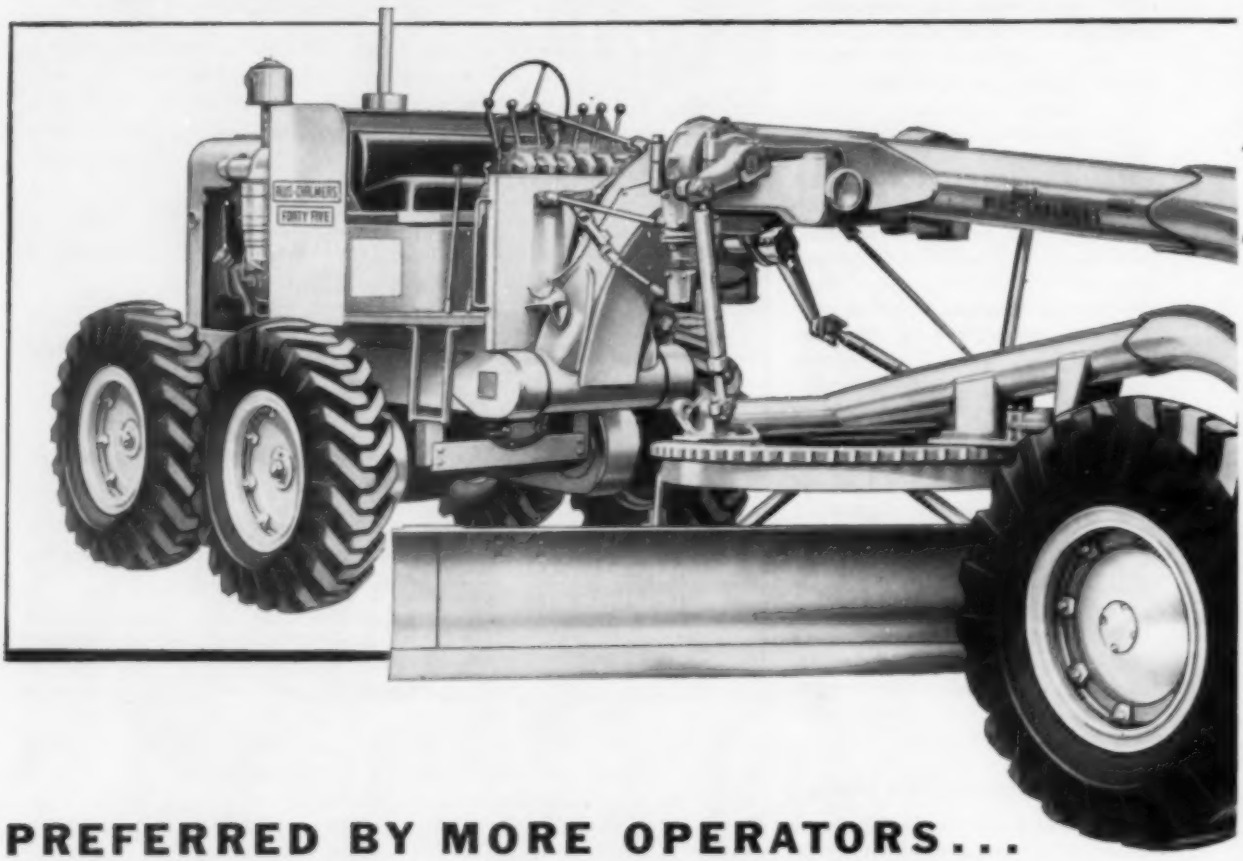
The photographer or team assigned the trip takes the department's station wagon, loaded with all the necessary photographic and safety equipment. Both photographers use 4x5 Graphic cameras and Royal-X Pan film loaded in Grafmatic holders. Underground lighting is provided by Heiland Nos. 5 and 91-A stroboscopic flash units.

The photographer making the 250-mi round trip between the mines and the Pueblo plant first checks in with the superintendent of the mine and Mr. Leonard, chief coal mine inspector. Mr. Leonard, the safety committee, foremen and perhaps some of the miners on the working shift meet at the exact location of the accident and begin reconstructing the scene. After all agree that the reconstruction copies the original as closely as possible, it is photographed from different angles.

Back at the Pueblo plant, the negatives are processed and the various views printed. Complete sets of the pictures are sent to the mining department and to the superintendent of the mine having the accident. The mining department incorporates the pictures with write-ups in its monthly safety bulletin and keeps the pictures on file. A like set and all the negatives are also recorded, cross indexed, and kept on permanent file at the office of the *Blast* Publicity Dept. in Pueblo.

The accident pictures also are posted on the mine's bulletin board convenient to the route of miners going to and from work. The miners can see at a glance exactly what happened and how they might, in the future, handle such a situation to escape injury. There is no need to ponder sketches or study through wordy descriptions. As Mr. Leonard says: "Photos show the facts."

For consistently tough jobs, compare with any other heavy-duty motor grader



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The FORTY FIVE has the power, weight, traction and speeds you need for high-production grading. Superior stability and precision control give you deep precision cuts or smooth finishes. The FORTY FIVE is built to take the shocks and strains of heavy-duty service — and to keep production steady. Allis-Chalmers, Construction Machinery Division, Milwaukee 1, Wisconsin.

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Advantages that mean more production . . . less maintenance . . . easier and better operation



Extra high axle and throat clearance means bigger loads at the blade.



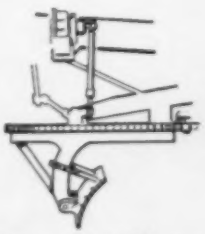
The ROLL-AWAY moldboard rolls dirt, gives more performance per horsepower, more production per gallon.



Fully enclosed power steering — easy control under all conditions.



Toggle-type controls are exclusive with Allis-Chalmers.

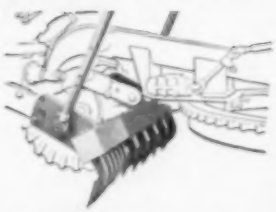


Front-mounted lift cases eliminate long shafts that twist under loads.

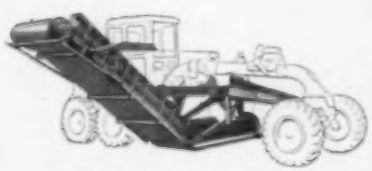
Matched attachments and accessories make it a year-round producer



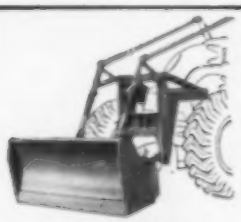
All-steel, stand-up cab



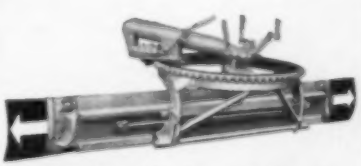
11-tooth, V-type scarifier



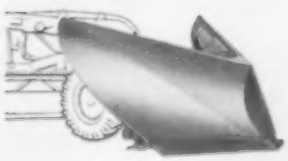
Hancock elevator



8-foot bulldozer



Hydraulic, shiftable moldboard



V-type snowplow

ROLL-AWAY is an Allis-Chalmers trademark.

Foremen's Forum



CREATIVITY starts with ideas and ends with achievements. However, fame and fortune may not come automatically.

Creativity and Its Rewards

The creative man is creative because he cannot be otherwise. He understands the value of cooperation and teamwork and the value of logical dissent when dissent is needed.

CREATIVITY is an elusive quality. It is the essence of life to some people, while others get along quite well without it. Some men are idea producers, others are idea executors. We need men of single-minded purpose of both types. But we also need men who can both produce and execute ideas on the grand scale.

These are matters of great importance to supervisors and engineers today. These leaders must strive to develop the spirit of creativity among the men they direct, and they must make every effort to properly recognize and reward the idea producers. At the same time, the leaders themselves must give thought to the development of their own spirit of creativity, their own urge to venture into the realm of untried ideas. However, the leader may have to find his rewards within himself. Some of our most creative people have been criticized and ridiculed for their efforts. The returns for creativeness are not always fame and fortune, right now and automatically.

Let's consider for a few minutes the rewards, or otherwise, that have come to some of our truly creative people. These returns range all the way from near-adoration at one end of the scale to virtual destruction of the idea producer at the other end, and all degrees in between.

Albert Einstein long ago fashioned the world we live in today when he created the new thought that $E=mc^2$. The destructive and benign uses of nuclear power have been developed on the basis of that simple expression of profound thought. Years passed while scholars wrestled first to understand then to establish proof or disproof of Einstein's theory. But at the close of his life Einstein knew that his contribution had been accepted and proved. His genius had been recognized and he had lived to graciously receive the homage due him.

Admiral Hyman Rickover, designer of the nuclear-powered submarine, apparently is hoeing a tougher row. Here is the authentic genius who developed a craft that someday, in a more peaceful time, could be used to transport cargo under the polar ice or under storms at sea. While making his definite contribution to progress the man has been buf-



Steel changes for the S-12V stopers are 24, 30, and 36 inches long. Overall stoper heights are 37, 43, and 49 inches.

Large openings and high vacuum make the Vac-Nu-Matic dust box equally efficient at removing dry or wet cuttings.



Right: The new S-12V Vac-Nu-Matic fills the need for a heavier dust-collecting stoper to speed up roof-bolting operations which are so essential to continuous coal mining.

New Le Roi Dust-Collecting Stoper Speeds Drilling in Hard Top Formations

S-12V stoper features popular Vac-Nu-Matic® dust collection system.

Enables miners to increase drilling footage with less effort.

The new Le Roi S-12V Vac-Nu-Matic stoper combines greater heft, more power, and positive "through-the-drill-steel" dust collection — for faster, dustless drilling of roof-bolt holes in hard top formations.

Its powerful piston impact, free-cutting bits, and powerful rotation assure faster penetration—eliminate stuck steel. The stoper's heavier construction is balanced for easy handling—enables the operator to work more efficiently and in greater safety.

Le Roi's Vac-Nu-Matic dust-collection system is an integral part of the stoper. Since no additional equipment is needed, the S-12V reduces set-up time and can be moved easily to any part of the mine.

Positive Dust Collection

All system components are specially designed to assure positive dust collection throughout the entire drilling cycle. This integrated design keeps dust count in the drilling area well below the approved Bureau of Mines standards.

What's more, the S-12V can be used with two types of bits to cope with changing seam structures. The Vac-Nu-Matic bit is best suited for soft formations, while the 5-hole CRD bit is recommended for medium to extremely hard top structures.

A touch of the operator's finger-tip provides finely graduated feed-pressure control to meet varying requirements. Constant blowing at the chuck keeps cuttings out of drilling mechanism, assuring long, trouble-free service. Other features include socket-type sliding chuck, end-seating automatic valve, positive pressure in both directions, and short stroke.

Feeds and Weights

The new S-12V stopers are available with 28-, 34-, and 40-inch feed legs, and weigh 105, 110, and 115 lbs. respectively. All are adaptable for hand-held operation or jumbo mounting.

Write today for information on the new stopers. Also ask about the new dust-collecting conversion kits that Le Roi offers to change older S-11 and S-12 stopers to cost-saving Vac-Nu-Matic dust collection.

"Vac-Nu-Matic" is the registered trademark for Le Roi's dust collecting stopers, bits, and dust boxes.

WABCO

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feted, passed over and generally jostled. Recent events, including bestowal of honors, indicate that the admiral may have squeaked through into deserved recognition by the skin of his teeth.

Charles A. Lindbergh's **Spirit of St. Louis** was a monument to his creative instincts. This plane was a dream which he nurtured into reality. It performed as he had planned it should. This was achievement of the highest order. But Lindbergh found that popularity and recognition may come attached to a yo-yo. Without passing judgment in the matter, we remind you that Lindbergh was bemedaled by Goehring of the Luftwaffe in the late Thirties. Immediately, the hero of 1927 became the object of abuse and scorn in many quarters. *Sic transit gloria* for the creative man, too.

Robert Hutchings Goddard, a New England scientist, launched an 11-ft-long liquid-fueled rocket in 1929. Recognition of this achievement and further development of the art, had they been forthcoming at the time, might have spared us the embarrassment of Sputnik I. The recognition Goddard received was the indignation of his neighbors, the ridicule of the press and warnings from the police. A kindred soul in this business of creativity, the same Charles A. Lindbergh, heard of Goddard's work, and it was through Lindbergh's efforts that funds were made available by the Guggenheim foundation for the continuation of rocketry studies in New Mexico. Goddard developed a multistage rocket; he worked with solid propellants; he fired a rocket faster than the speed of sound; in 1918 he worked on a forerunner of the World War II "Bazooka." In 1941 he had developed a rocket strikingly similar to the German V-2 which began to strike London 4 yr later. Thus the man who might have given the U. S. a lead in the development of missiles won little recognition for his work at home in his lifetime.

Gen. Billy Mitchell fared even worse. He was one of the first to see that air power would have a tremendous effect on national defense. Mitchell created new concepts of defense and attack. Subsequent events proved the merit of his work, but in the meantime he had passed away, the victim of a broken heart his closest associates say. And years later his family still labors to have his name cleared in official records.

The Need Today

We grant that high-poweed creative people may be hard to live with. Tact and diplomacy may not be their strongest points. But we ask you to remember that truly creative men drive themselves in their work almost to the breaking point. If you supervise men like this, don't let your possible dislike of their personalities becloud your appreciation of what they can do. On the other hand, if you are the creative soul, try not to lacerate others with your bluntness. You might make a lot more headway with your ideas.

What are the marks of a creative person? Well, with apologies for our brevity in a matter of such great importance, we suggest that a creative person is a "doer" who is not overly fond of acclaim or riches and who is willing to raise a logical dissenting voice when he sees the need. Furthermore, the creative man is creative because he cannot be otherwise. Creativity is a quality of the spirit.

In an address to the 1958 graduates of Rensselaer Polytechnic Institute, Robert Paxton, president, General Electric Co., spoke on creativity, conformity and dissent, as follows:

"One of the worst canards circulated about industry is the notion advanced in recent years that industry seeks men who are blind conformists—men who lack values and principles of their own and seek to please by uncritical acceptance of beliefs and choices. Nothing could be farther from the truth.

"That such men are to be found in industry, as in all walks of life, cannot be denied. Industry does not prize them. The men most sought are those who have the qualities of self-reliance, courage, resourcefulness, and independence of judgment that all through history have distinguished superior men from inferiors.

"After all, if a company is to adapt quickly to changed conditions, it must have a constant flow of creative new ideas. It needs the contributions of men who can escape the bonds of conformity to recognize emerging new problems and offer fresh solutions.

"A thoughtful man will not make a fetish of uncritical conformity. Neither, of course, will he scorn or resist situations calling for teamwork and cooperation. His self-respect will prevent the first, and his intelligence the second.

"A profound understanding of this general point is necessary, not alone for the sake of a successful career and not only for the advantage of companies that need creative, resourceful people. More fundamentally, an appreciation of the need for competition of ideas, tolerance of dissent, and unquestioned freedom of opinion safeguard the preservation of a free way of life."

The Safety Alphabet

The following safety alphabet, reprinted from *Powergrams*, a publication of Alabama Power Co., was written by Arthur Carter, street-lighting maintenance man for Alabama Power.

A Alertness	**Always**
B Begets	**be**
C Carefulness	**careful**
D Do	**Don't**
E Everything	**excuse**
F Faithfully	**failures**
G Give	**Get**
H Helpful	**help**
I Ideas	**immediately**
J Join	**Jointly**
K Know-how	**keep**
L Leaders	**levelheaded**

M is for Makeshift—Never use something in place of the right things.

N is for Narrate—Tell what the safety book says concerning the work you are to do before starting the job.

O is for Obey—Submit to the rules of safety at all times.

P is for Practice—Repeat doing things the safe way over and over.

Q is for Question—Ask about things you are not familiar with or that you are not sure about.

R is for Responsibility—Each worker is responsible for other crew members where safety is concerned.

S is for Sober—Be sensible and serious about safety meetings and practices on the job.

T is for Tact—Tactfulness means doing the right thing in difficult situations.

U is for Unselfishness—Be considerate of fellow-workers and the general public in performing work safely.

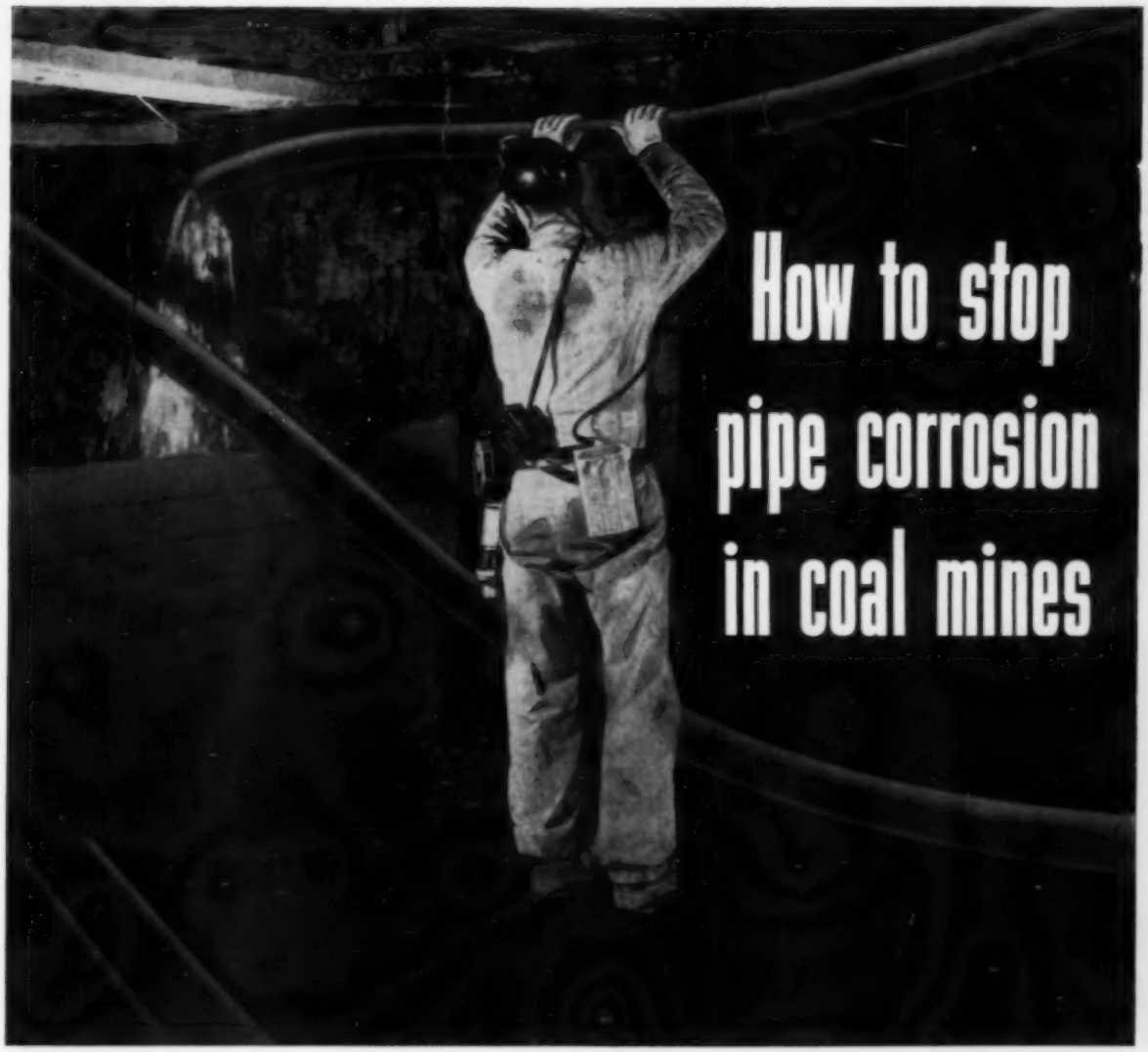
V is for View—Look the situation over carefully before beginning the job.

W is for Watch—Watch out for the welfare of fellow-workers and the public.

X is for X-ray—Examine all equipment thoroughly for defects, and discard defective equipment.

Y is for Yearn—Each man should have a desire to be a safe worker.

Z is for Zeal—He should be eager and enthusiastic about safety.



How to stop pipe corrosion in coal mines

Simple. Use USS NATIONAL* Polyethylene Pipe. Mine water has no effect on it. Acids, alkalis, salts and most chemicals are helpless against its tough, inert composition. So, you install it once and forget about it.

Tough and flexible

NATIONAL Polyethylene Pipe won't crack from rough handling, even at low temperatures. And it remains rugged and flexible over its entire working range from −90°F. to +120°F.

Light and workable

A coil of NATIONAL Polyethylene Pipe can be carried on the shoulder. It unrolls like hose, turns corners, goes over or under obstructions. Easily joined with insert-type fittings, secured with stainless steel clamps. All types of fittings available for any layout.

Manufactured from pure 100% "on grade" polyethylene raw material, USS NATIONAL Polyethylene Pipe is available in sizes from ½ inch to 6 inches in diameter, in a variety of wall thicknesses. For full details, write to National Tube Division, United States Steel Corporation, 525 William Penn Place, Pittsburgh 30, Pa.

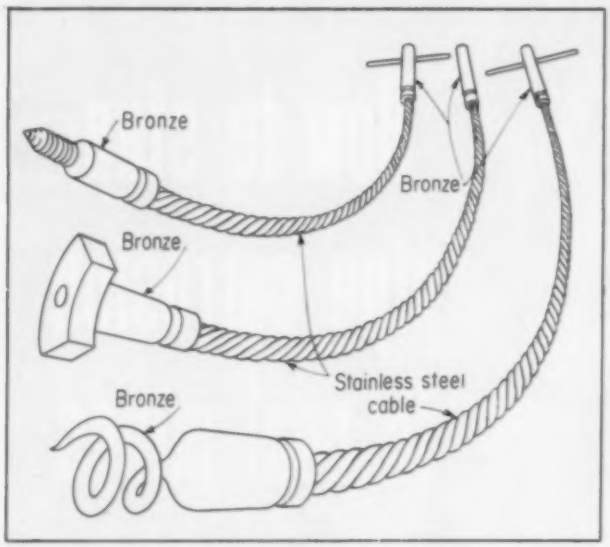
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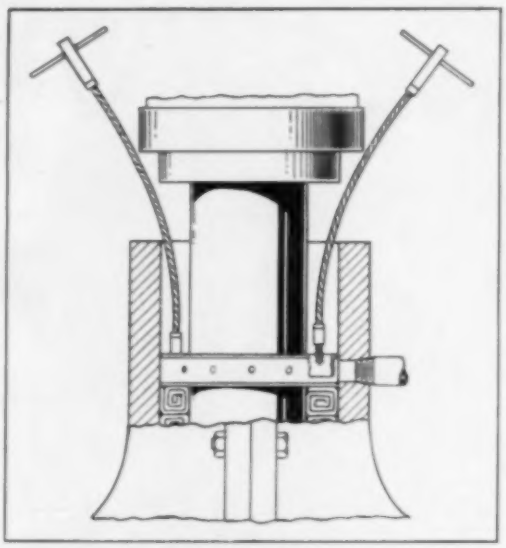
This seal of the National Sanitation Foundation means Tested . . Approved . . Sanitary!

National Tube Division of USS United States Steel

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Operating Ideas





Flexible-Handled Tools Speed Lantern Gland Work

MAINTENANCE WORK on parts in inaccessible places is speeded with the aid of a set of shop-made cable-handled tools, writes J. K. Paul, Oak Ridge, Tenn. He says the set of tools was made primarily to work on centrifugal pumps, but there is a variety of machines using lantern glands, such as, air compressors, pumps, packed valves and hydraulic rams. The same idea can be used for putting flexible handles on Allen wrenches needed for repair jobs on electrical panelboards.

This set of pullers and rams is made from odd pieces of stainless steel cable, which never rusts and has the right flexibility and stiffness to serve as handles. The three tool ends are machined from Ampco bronze metal and are brazed onto the cable. The handles are easily fabricated from bronze pipe and have a cross handle inserted in a drilled hole and brazed in place. Threads on any screw-head section can be cut as desired.

The "cork puller" is especially valuable in removing quickly any backed-in packing that resists most means employed to remove it. The tamper gets the rings down so the gland fits like a glove.



Shop-Made Track Cleaner

HERE'S ONE WAY to solve the track cleaning problem. A steel V-shaped shoe secured to the loading head of a Joy loader converts it into an efficient track cleaner, writes Anthony Shacikoski, mining consultant, Avonmore, Pa. He says that where carchange switches are not too far away, two men can clean 2,000 ft of track in a shift.

The shoe is pulled over the gathering head of the loader and held tightly in place by eye bolts and chains. Eye bolts are run through holes in the head and by tightening nuts on the bolts the shoe is pulled into place. Slots are cut in the shoe so it can be positioned close to the ties but kept clear of bonds and splicebars. Small shoes of various sizes are fitted into the slots so the machine can be used on different sizes of rail.

Aside from drilling holes for the eye bolts, Mr. Shacikoski notes that several other minor changes were made in the loader. These include shortening the gathering arms so they don't strike the rails and building up the arms into paddles to make possible faster loading of fine material.

CONVEYOR BELTS

"After 20 years, 'U.S.' still gets the replacements," says plant foreman



Mr. James Campbell of Guyan-Eagle Coal Co., Kelly (West Va.), knows why Guyan-Eagle has been using (and replacing with) "U.S." belts for the last two decades... why today they have 17 belts operating in their 5 mines. In the words of the company's own officials, U.S. Belts are:

"The most dependable in our experience."
"Resistant to abrasive action of rock."
"Strong, durable – maintenance is minimum."

That's why, when Guyan-Eagle opened its latest mine (No. 5) it was no surprise that they equipped the system with "U.S." Belts to move the 5,000-ton daily output. *Once a "U.S." Belt user, always a "U.S." Belt user.*

The 6 "U.S." Belts in No. 5 mine range in size and capacity from the 195', 42"-wide stoker coal conveyor up to the 1700' main slope belt, a 48"-wide U.S. Giant® carrying 515 tons of ROM coal (up to 500-lb. lumps) to the shaking screens in the scalping plant. All are performing perfectly.

• • •

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Operating Ideas (Continued)

Tightening Tips To Improve Mine Maintenance Practices

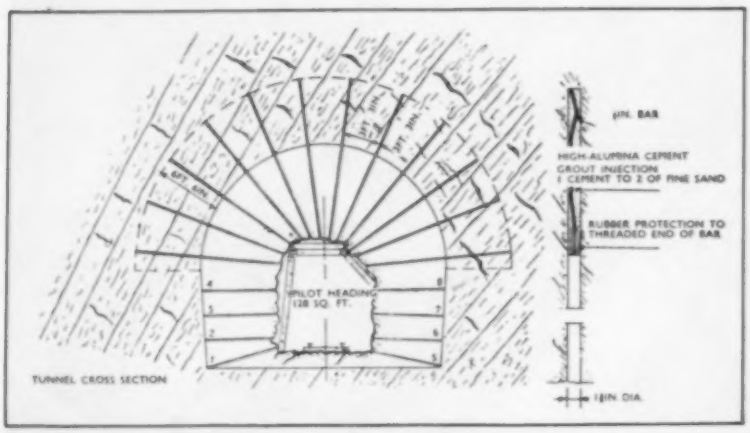
HOW MUCH should a bolt, capscrew or nut be tightened? Around the maintenance shop there are many definitions of tightness. It's quite common to hear such terms as "finger tight," "snugged," "seated" or "so many foot-pounds tight."

To tighten a bolt the nut must be turned down until the bolt begins to stretch. Any degree of stretching is the result of the tension from the torque applied to the nut as it is moved up the bolt's thread. Air-cleaner wing nuts, for example, are considered "finger tight" when enough torque has been applied by the hand to hold the cleaner tray securely in place. A crankcase drain plug is considered "snugged" when it is tightened enough to hold it in place and keep oil from leaking past the gasket. A fitting is "seated" when it is turned into position although not necessarily placed in tension. Each of these terms is relative and amply describes non-critical degrees of tightness.

Naturally, it's impractical to torque all bolts to close tolerance. According to the service department of Caterpillar Tractor Co. there are, however, many instances where exact torque must be applied. Service department personnel point out that hydraulic pumps and valves, for example, have small internal clearances. While it is desirable to have the parts of these units assembled tightly, too much tightening will reduce internal clearances to zero. Main and connecting rod bearings are round only when the correct torque is applied to the cap nuts. Too much torque will put these bearings out-of-round and cause failure of the parts when the engine is put back into service. Excessive tightening of cylinder-head studs can distort the head, with a good probability of leakage, warping and cracking.

A torque wrench should be used to obtain a specific torque when the degree of tightness is critical. If the torque is not measured it is easily possible to get an improper gasket crush from too little tightness, or cause distortion or bolt "set" from excessive torque.

Use of the torque wrench will make possible consistently accurate results every time. Like most tools, there is a correct way of using it. Torque should be brought up in increments by using a steady pull. Jerking the wrench will result in higher torques than are actually indicated on the dial.



Pre-Bolting Cuts Tunneling Costs

STRENGTHENING ROOF by pre-bolting from a pilot tunnel increases safety, cuts roof-support cost and offers the possibility of reducing the number of stages of excavation, according to *Iron & Coal Trades Review*.

The method was used in driving a tunnel 470 sq ft in area 7,500 ft through the French Alps. The greatest improvement was in the men's feeling of security, which alone was said to be well worth while. Furthermore, timber cost was reduced by 10% and volume of grouting was reduced 30%. Comparing the 2,100 ft of pre-bolted tunnel with the unbolted part, it was estimated that 37 days were saved.

Work consisted of driving a pilot heading at the base of the final tunnel and then pre-bolting beyond the finished opening. From the 128-sq-ft pilot opening, holes 15 ft long and 1⅜-in diameter were drilled in a radial pattern 6 ft 6 in beyond the finished excavation line. Mild steel rods, ½ in by 6 ft 6 in and slightly wave-shaped, were driven into the hole ends. These holes were 3 ft 3 in apart at the finished excavation line. The ends of the bars facing the opening were threaded to take anchor nuts for roof support because the ground was fissured into blocks.

Before blasting, grout was pumped into the part of the hole beyond the excavation line, and was held in by a rubber plug through which the injection tube passed. Injection pressure was 200 psi, grout mix was one part of high-alumina cement and two parts fine sand, and setting time was 30 min.

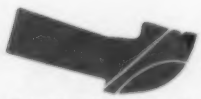
Fireproofing Mine Roadways Quickly and Economically

FROM ENGLAND comes this idea for mechanized fireproofing of haulageways. Fireproofing of certain roadways is required by law in England and to enable this work to be done quickly and economically, W. M. Witt, foreman fitter at Bestwood colliery designed a machine. It uses compressed air to spray the sides and roof with a non-flammable mixture of water, sodium silicate and limestone, according to *Iron & Coal Trades Review*.

The unit consists of a 18-in-diameter cylindrical tank, 4 ft long; power-driven revolving paddle agitator; hose; spray gun; and valves. Of all-welded construction and tested to 200 psi, it is mounted on wheels for transportation on mine tracks.

A 7½-in-diameter quick-sealing lid is provided at the top of the tank. The tank is filled with a mixture of 6 gal of water, 6 gal of sodium silicate and 6 bags of limestone dust. A small quantity of bentonite is added to help maintain a smooth mixture.

After the tank is sealed, compressed air is admitted at 25 psi. At the same time air is admitted to the hand spray gun by a valve connecting the gun to the air supply. This air supply joins the mixture as it leaves the spray nozzle and atomizes it so that it spreads evenly upon the surfaces of the haulway.



Style GR, cylindrical insert



HR Style, 1½" gage stop



JN for continuous miners



HJN recovery auger bit



G Style, straight shank



Style GN, notched shank



JC Colmol and Boring bit



GV, for Joy GV-6111 chain



KN Style, chisel-nose tip



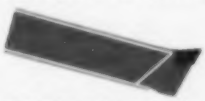
HN Style, 1½" gage stop



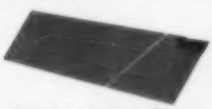
Style A straight shank



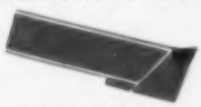
Style C for impurities



Style D for coal, potash, salt



Style E for Goodman Borers



Style CC, milled shank



L Style for Bowdil ML chains

CARMET OFFERS 25 STYLES OF MINING TOOLS

for every condition you have

Carmet carbide mining tools get high-tonnage production because they're precision made to meet specific mining operations. Hard, tough grades of carbide are induction brazed to high alloy, heat treated shanks in a way that insures maximum tool life. Cutter bits are designed for shortwall, longwall, universal machines and continuous miners of every make. Drill bits drill clean, straight holes at fastest speeds. Carmet distributors keep a complete line of Carmet Mining Tools in stock for prompt delivery. Carmet field engineers are always on call to help you solve tool problems and cut mining costs. Take advantage of their know-how now.

NEW CARMET MINING TOOL CATALOG NOW AVAILABLE FROM YOUR CARMET DISTRIBUTOR

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Crandall Eng. Co., Inc., Birmingham, Ala.
Drillmaster Supply & Mfg. Co., Evansville, Ind.
Gladstein Co., McAlester, Oklahoma
Marion Mine & Mill Sup. Co., Whitewell, Tenn.
McCombs Sup. Co., Jellico, Tenn.; Harlan, Ky.
Oglebay, Norton Mine Supply Div., Offices: St. Clairsville, Ohio; Johnstown, Pa.
Parsinger Supply Co., Williamson, W. Va.
Parsinger's Inc., Charleston, W. Va.
Union Supply Co., Denver, Colorado
U. S. Steel Supply Co., Pittsburgh, Pa.
W. B. Thompson Co., Iron Mountain, Michigan
Vanguard Equip. & Supply, Chicago, Ill.

The newly revised 5th Edition of the Carmet Mining Tool Catalog contains application data and specifications on the complete line of Carmet Mining Tools, including a complete section on grinding and reconditioning. For your copy, write Carmet Division, Allegheny Ludlum Steel Corporation, Detroit 20, Michigan.



ADDRESS DEPT. CA-10



N Style special clearance bit



O Style for rotary head miners



R Style finger bits



Style UL coal drill



Style VL drill bit



W Style for friable seams



WW Style, power and hand drilling



T and TT Styles for roof bolting



S and SS Roof Bolting drills

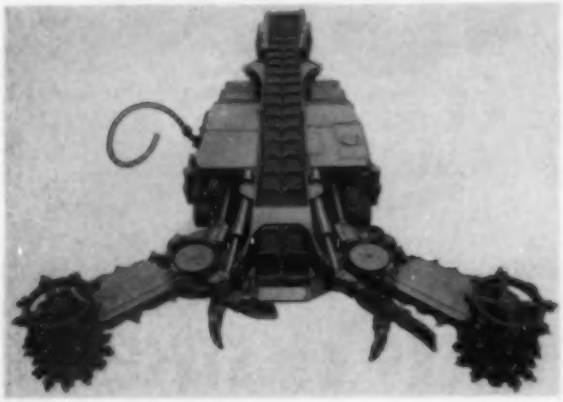
The Original DOUBLE-BONDED Carbide Cutter Bit

CARMET

AL

WSW 7289

Equipment Developments



Miner for Low Coal Seams

The Lee-Norse Co., Charleroi, Pa., has come out with a new 16-ton miner for low coal seams, 30 to 48 in high. The LCM-28 gets its range from its hydraulically adjustable top cutter. The miner's vertically-mounted cutter drums are together like a clam shell, thus allowing it to gather as well as cut the coal. The cutter drums are designed to block out coal for proper breaking from the face, giving maximum sizes. Lee-Norse says the twin cutter heads operate effectively over a maximum face width of 16 ft, while its dual gathering arms gather all of the coal, regardless of the position of the machine, with no auxiliary loading equipment necessary. Its capacity, they say, is 2 to 3 tons per min. Controlled tramming speed gives proper sumping action, and dual pump combination gives high tramming speed. Its 24-in flexible conveyor is hydraulically driven.



Resin Anchors Roof Bolts

Roof bolting in mines with soft and failing roofs is no longer a problem, according to Pattin Mfg. Co., Marietta, Ohio. Pattin says its new patented system, called Air-Seal resin process, will hold in soft roofs and is more permanent than ordinary roof bolting. The Air-Seal process features an air-sealing plastic resin in a special container, with each container holding the exact amount of resin and catalyst needed for one bolt hole. The container is inserted into the bolt hole ahead of the expansion shell and bolt, and pushed into place. When the bolt is in the hole and the tightening begins, the container is crushed. This releases the resin flow over, around, and into the shell and surrounding strata. The resin cannot run down the bolt, because of positive sealing washers and an expanding gasket under the shell. The resin quickly solidifies into a tough, adhesive mass. Also, it penetrates the soft shale around the expansion shell and prevents crumbling of the sidewalls where the shell is anchored. Both shell and strata are thus bound together into one solid mass at the anchoring end of the bolt. The holding power and permanence of this new process multiplies the holding power of a regular bolt and shell many times, says Pattin. This makes it even more valuable for use in haulageways and airways which must be kept open for years. The hardened resin is impervious to oxidation, water, oil, gas, or acids.



Self-Contained Rotary Drill

Robbins Machine & Mfg. Co., Oneonta, Ala., has added another model to its line of rotary drills for drilling blastholes. The new model, RR9, is a completely self-contained drill since the power for the air compressor comes direct from the tractor front power take-off. The tractor engine supplies all of the power necessary for the drilling operation. Robbins reports that the unit applies 50,000 lb down pressure on the drill bit, and is easily leveled on grades up to 15%. It handles 20 ft sections of drill pipe. The RR9 drills holes in diameters from 6⅝ to 9 in.



Automatic Lubrication

Fully automatic and electrically operated, two new centralized lubrication systems, called "Electro-Luber" have been introduced by Lincoln Engineering Co., St. Louis. The systems are designed to provide high- or low-pressure centralized power lubrication for industrial machinery. Lincoln reports that the units are highly efficient in supplying oil or grease to banks of injectors in a centralized lubrication system. The operation is entirely electrical. An outstanding feature, says Lincoln, is the safety shut-off that operates automatically if the pump runs dry or a supply line breaks. Two models, 1,000 psi and 2,900 psi maximum pressure, are available. Power for the units is supplied by a ¼-hp motor.



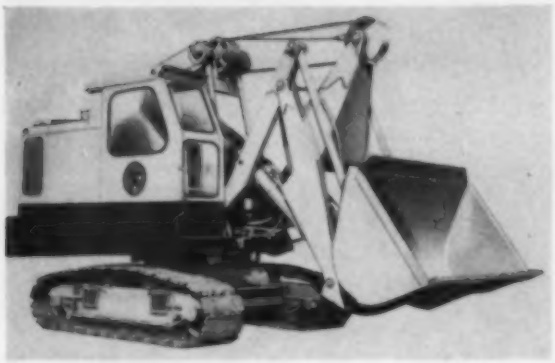
NEW CP ROOF BOLTING UNIT

Completes entire bolting cycle—on the double!

Less than 3 minutes! That's all it takes the new RBD-30-579 to complete an entire roof bolting cycle from hole drilling to bolt setting. (Where hole depth is less than 36", the entire cycle can be completed in 1½ minutes.) *New* stepped-up motor HP gives it 30% more power . . . *New* 40% increase in gear strength means beefed-up capacity in auger and bolt setter gear train . . . *New* built-in cooling fan yanks heat away from enclosed motor, adding life to insulation. Furnished with low speed spindle adapter for slow speed drilling plus low seam drilling attachment for low coal. *Chicago Pneumatic Tool Company, 8 East 44th Street, New York 17, New York.*

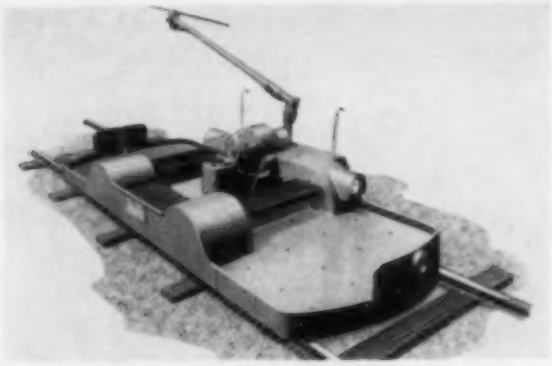
Chicago Pneumatic *8 East 44th Street, New York 17, N. Y.*

PNEUMATIC TOOLS • AIR COMPRESSORS • ELECTRIC TOOLS • DIESEL ENGINES • ROCK DRILLS • HYDRAULIC TOOLS • VACUUM PUMPS • AVIATION ACCESSORIES



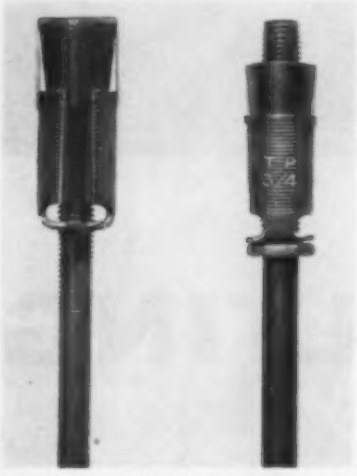
Stand-Still Digging, Loading

The introduction of a tractor loader-digger gives speed loading a shot in the arm, according to Koehring Div., Koehring Co., Milwaukee, maker of the new unit called "Skooper." The Skooper utilizes the fast swing of an excavator turntable and a 7 ft independent loading action to enable it to go through numerous complete loading cycles while standing in one place, says Koehring. Job condition tests have shown that the Skooper, operated with 70 hp can load 400 tons per hour. Available with buckets ranging from 1⅞ to 2½ cu yd, the Skooper has a cutting height of over 17 ft. Versatility of the unit is enhanced by easy change-over to a ½-yd hoe, ¾-yd clamshell or dragline, or a 10-ton lift crane.



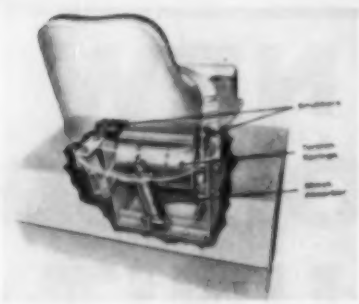
Mine Mechanic Jitney

A Mine Mechanic Jitney designed for servicing emergencies and accommodating five men, including the operator, with additional space for tools and equipment, has been introduced by the Lee-Norse Co., Charleroi, Pa. With a body height of 19⅜ in and a ground clearance of 3½ in, the Jitney's total height above the rails is 30 in. Overall width is 64 in, and the length is 12 ft. The Jitney is powered by a 7½-hp open type motor for either a 250 or 500 volt, DC. Its axles, both driving, are spring-suspended on anti-friction bearings. The wheels are 16 in cast steel. A hydraulic hand service brake, disc airplane type, is mounted on the jackshaft. A hand ratchet lever operates the dual-band-type parking brakes on the axles.



More Roof Holding Power

Fourteen months of testing by regular bolting crews in actual mine conditions are behind this new roof bolt expansion shell called "Top-Tite." The maker, Thompson Products, Inc., Valve Div., Cleveland, says that the new shells consistently hold better in any kind of top material because of several built-in advantages. The fine-tooth leaves transfer the bolt load without damaging the material in the hole wall, and assure load-carrying contact for the entire leaf area. The leaves themselves are strengthened by a large plug to back them up. Also, says Thompson, the leaves won't break during insertion, nor will they mis-align or cock when forced into dog-legged holes. One-piece construction of the leaf prevents separation of the plugs from the leaves. Other advantages claimed are reduced bolting time, and ability of the shells to hold in over-sized holes.



Tractor Suspension Seat

The correlation of more operator comfort to higher production has long been known. But a new suspension seat system just put out by Caterpillar Tractor Co., Peoria, Ill., claims a step toward more operator comfort in its line of rubber-tired tractors. Caterpillar reports that comparison tests between its new seat, called Torsionflex, and standard seats showed the new seat gave a much more even and smooth ride over the same terrain. The secret behind the new seat's smoothness is in its arrangement of three resilient rubber torsion springs that absorb the shock of ground impacts with their resilient twisting action. The rebound of the bounce is controlled by a double-acting shock absorber.



Coal Erosion Control

American Cyanamid Co., New York City, has a new product called Aerospray 52 Binder that it claims will effectively control loss of fine coal due to erosion by wind and rain. The binder is a water emulsion of a synthetic resin. It forms a protective crust when sprayed on exposed surfaces of coal while it lays in open storage, or in transit in open railroad cars. Full crust protection is afforded about 6 hours after spraying. The solution is made up by diluting with water to any desired strength. Most requirements are met with a solution containing 3 to 15% of the Aerospray solids by weight.

B.F.Goodrich





B.F.Goodrich tires haul coal uncovered by world's largest shovel

BIG PAUL takes a 70-yd., 105-ton bite of overburden at the Peabody Coal Company's River King mine near Freeburg, Ill. This world's largest shovel towers 147 ft. 6 in., can dig, hoist, swing and dump its load in 50 seconds! The coal it uncovers is hauled by truck to the preparation plant 5 miles away. The road has a rock base—and loads run as high as 80 tons. Peabody assigns this rugged hauling job to B.F.Goodrich Rock Service tires. Here's why:

Rock Service tires are built with B.F.Goodrich FLEX-RITE NYLON cords that withstand double the impact of ordinary cord materials, resist heat blowouts and flex breaks. No wonder the FLEX-RITE NYLON body outwears even the extra-thick Rock Service tread, can be retreaded over and over!

Husky Rock Service cleats grip the ground for positive traction in forward or reverse. The tire is built to flex evenly—no localized strains that cause unnecessary tire failures! See the new B.F.Goodrich Rock Service—tube-type or Tubeless—at your B.F.Goodrich dealer's. He's listed under Tires in the Yellow Pages of your phone book. Ask to see his complete line of tires for every mining job. *B.F.Goodrich Tire Co., A Division of The B.F.Goodrich Co., Akron 18, Ohio.*

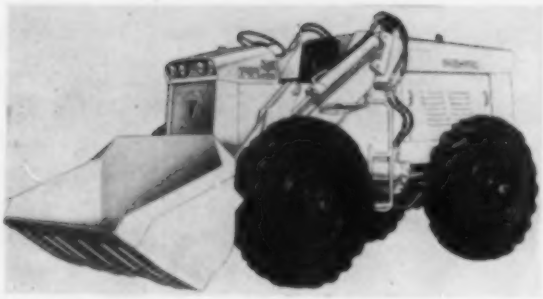
Specify B.F.Goodrich Tubeless or tube-type tires when ordering new equipment



Smileage!

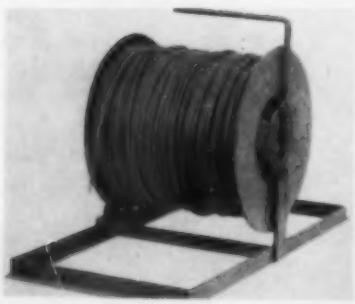
B.F.Goodrich *truck tires*

© The B.F.Goodrich Company



Front End Loader

Production of a new 4-wheel drive 1¾-cu yd front end loader has been announced by Tractomotive Corp., Deerfield, Ill. The 15,850-lb TL-16 Tractoloader has a maximum lifting capacity of 14,000 lb and a breakout force of up to 18,400 lb. Powered by either a 101 hp gasoline or 97 hp diesel engine, the machine can travel at speeds up to 27 mph in either direction. Highlights are reported to include rear-wheel power steering, four-wheel power brakes which can be operated by either foot, six-way adjustable seat, bucket level indicator, rear-axle disconnect and a fully enclosed hydraulic system featuring three types of filters.



Detonating Fuse

Austin Powder Co., Cleveland 13, Ohio, has brought out a new detonating fuse for firing insensitive blasting agents, such as ammonium nitrate, which is said to improve their performance by increasing their rate of detonation. In many cases the 175 grain fuse eliminates the need for a high explosive primer. A tough, waterproof polyethylene coating protects the fuse from chipping, peeling and cracking while being laid. The fuse is reported insensitive to shock, abrasion and stray electrical currents, and can be detonated only with a fuse and cap or electric blasting cap. The ⅜-in diameter fuse comes in 500-ft reels.



Fluid Drives and Couplings

Dodge Mfg. Corp., Mishawaka, Ind., has expanded its line of Flexidyne dry fluid drives and couplings. Now available are three larger sizes and one small size. One new unit will deliver 200 hp at 1,200 rpm, another up to 800 hp at 1,200 rpm, and the largest will deliver 1,000 hp at 900 rpm. The small addition is rated up to 2 hp at 1,800 rpm. Said to insure smooth, shock-free starts, the Flexidyne picks up heavy loads gradually, permitting use of smaller motors, reducing maintenance and eliminating costly starting equipment. Torque capacity of all units can be varied. The full line consists of eight drives and ten couplings.



Speed Reducer

Coal Machinery Research, Inc., Logan, W. Va., has designed a new speed reducer for 9-J motors used on crawler-mounted machine trucks and loading machines. Features of the unit listed by the manufacturer are: (1) gear ratios available from 1:1 to 76:1, (2) minimum number of bearings and (3) a bearing adjusting nut marked in 0.005-in graduations to adjust bearings properly. Under normal operation the unit is said to perform, trouble free, for a minimum of 12 mo if properly installed and lubricated.

Visual Indicator Gas Mask

A window indicator which shows that a gas mask is no longer effective against carbon monoxide highlights the Window-Cator canisters developed by Mine Safety Appliances Co., Pittsburgh 8, Pa. A window in the canister is divided in half, with one side containing a dark blue indicator color and the other containing a light blue reference color. When the dark blue color changes to match the light blue, the canister is spent. This device is claimed to replace mechanical timers, which only approximated the actual condition of the canister. An external check valve on the new canister prevents exhaled air from entering and protects against moisture penetration. An improved plastic coated tape is reported to prolong canister life in storage by guarding the bottom against moisture. Conversion kits for older masks are available.



Hose and Cable Bridge

A 32-lb steel casting has been developed by Calumet Steel Castings Corp., Hammond, Ind., to protect hose and electric cables in areas where heavy vehicle traffic could damage them. The flexible, interlocking bridge is reported having integrally cast joints at each end to facilitate linking any number of units together without use of tools.



Rugged Tire for Mining

General Tire & Rubber Co., Akron, Ohio, has announced a rugged new tire for rough use such as mining. Called the Rock Rib LCM, the new tire, constructed of Nygen cord, has an ultra-heavy ribbed tread with a variable slope in the groove design which is reported to aid in ejection of stones. Designed for use on front wheels, the tire comes in 12 to 20 ply construction.



ILLINOIS . . . The Ward Leonard variable voltage system on this 40-R provides for the most favorable drilling speed through changing formations. It gives the operator smooth, instant command over rotation of the drill pipe. To meet requirements, he can vary the speed without stopping the drilling operation. The 40-R drills rock overburden at a coal mine in southern Illinois.

These Owners Profited from Bucyrus-Erie Rotaries . . . YOU CAN TOO

Bucyrus-Erie rotary blast hole drills have reduced drilling costs for mine operators all over the country. Some of the reasons why these rotaries put down big holes fast are indicated in the accompanying captions.

And here's an extra bonus: Bucyrus-Erie rotaries are now manufactured in a new plant devoted exclusively to the manufacture of drills in Richmond, Ind. This means faster, more direct service for you.

Look over the pictures and brief descriptions. See how an exclusive combination of features helped these owners put down hole fast. Then contact us for full information. 81B58C

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BUCYRUS-ERIE COMPANY • DRILL DIVISION
U. S. HIGHWAY 40 WEST, BOX 324, RICHMOND, INDIANA

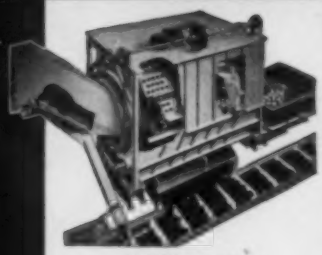




PENNSYLVANIA . . . The 40-R at this eastern Pennsylvania coal mine achieves the greatest possible penetration because maximum down pressure can be exerted on the bit while the drill pipe is turning slowly. In softer formations, the operator can increase rotating speed substantially as he cuts down pressure. He can match pulldown force and rotation speed so tools do not advance faster than cuttings are removed.

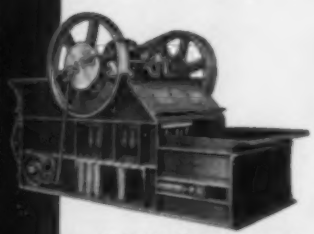
INDIANA . . . At a strip mine lease in southwestern Indiana, this 50-R drills 10⅝-in. holes to prepare overburden for stripping. The 50-R, operating under full-electric power, is capable of drilling holes from 9⅞ to 12¼ inches in diameter. The smaller 40-R, with either full-electric or diesel-electric power, drills 6¾ to 9-in. holes.

America's most complete line of CRUSHING EQUIPMENT



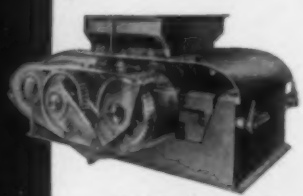
McNally Pittsburg Rotary Breaker

This unit allows positive control of top size in handling run-of-mine washery feed. Production of fines is held to a minimum.



McNally Norton Vertical Pick Breaker

50% Less fines when reducing lump to egg and stove sizes.



McNally Double Roll Gearmatic ROM Breaker

Built in tonnage ranges from 750 tph to 1400 tph. Full floating gearmatic drive.



McNally Gearmatic Stoker Coal Crusher

This unit offers three prime advantages: high volume production, plus accurate sizing, plus low percentage of fines.



McNally Single Roll Crusher

Universal application 20", 24" and 36" diameter rolls.

AVAILABLE

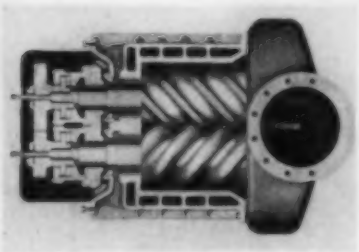
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McNALLY PITTSBURG MFG. CORP.

Pittsburg, Kansas Wellston, Ohio

Equipment News *(Continued)*



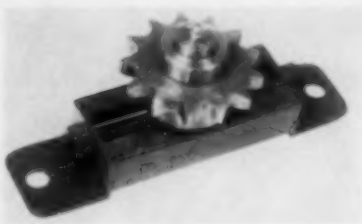
Rotary Compressor Line

A new line of positive-displacement rotary compressors that rival the efficiency and stability of reciprocating machines while matching the compactness and low maintenance of centrifugals has been announced by Fairbanks, Morse & Co., Chicago. The compressors, two-impeller, helical-lobe type, axial-flow machines, based on a proven Swedish design, have a standard capacity range of 800 to 13,000 cfm and pressures up to 175 psi for certain models.



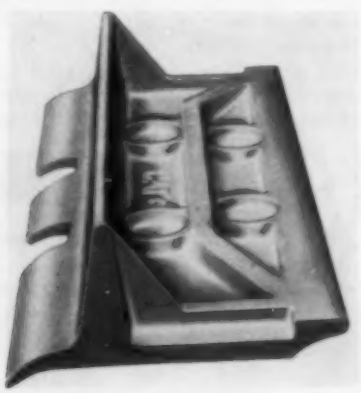
New Tractor-Shovel

A new four-wheel-drive, rubber-tired tractor-shovel with 7,000 lb carry capacity has been put out by the Frank G. Hough Co., Libertyville, Ill. Called the Model H-70, the new unit replaces the Model HH Payloader. According to Hough, the H-70 features more power, more traction, stronger components, more efficient torque converter, power-shift transmission, power-transfer differentials, power steering, pry-out bucket action, safety boom arms, and power-boosted brakes. Gasoline and diesel engines supply from 105 to 110 hp. Diesel engines are available in either 2- or 4-cycle types. An additional 1,500 lb of weight on the rear wheels give better traction and greater digging effort. The axle assemblies are 40 to 80% stronger, and also wider for more stability.



Chain Drive Adjustment

A new development to smooth out roller chain drives and provide ample take-up for fixed-center and vertical chain drives has been introduced by Industrial Marketers, Ferndale, Mich. Incorporating a fixed shaft on a heavy lead-screw built into a welded steel frame, makes the Chain Tightener compact, sturdy, and unbreakable, says Industrial. A pressure lubrication fitting and safety set-collar are included. Industrial says the Chain Tightener is unique in that the adjusting screw allows fine adjustment of the chain on the slack side while the drive is operating. Two stock sizes are available.



Tractor Track Shoe

The ability to become "work hardened" under continued pounding of extreme applications is the claim of a new track shoe introduced by Caterpillar Tractor Co. Designed primarily for work in rock and slag, the new grouser shoes are cast from high manganese steel containing 12 to 14% manganese. Ac-



EASY LOADING WITH CYANAMID EXPLOSIVES & PERMISSIBLES

Count on engineered blasting with Cyanamid explosives to shoot coal to a size your loading machines can handle at full speed and capacity ... with no wasted digging time!

Ease of loading is but one of the many advantages of using Cyanamid's *complete line* of permissibles and electric blasting caps. You also get highest quality materials ... expert technical advice on special problems ... delivery direct from our national network of plants and magazines.

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NEW FOR YOUR CONVENIENCE...

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TWENTY-FIVE COMPLETE SETS OF FLEXCO HD BELT FASTENERS NOW AVAILABLE IN ONE EASY-TO-HANDLE ECONOMY BULK PACKAGE

There's no need now to carry several 10-set boxes to the job—every "25-PAK" contains 25 complete sets of FLEXCO Fasteners (bottom plates, top plates, clips, nuts and bolts) . . . enough FLEXCO Fasteners to join common belt widths (for example: one "25-PAK" box, size 1½E, will join a 36" belt.) Our savings from bulk-packaging are passed on to you!

Label on each "25-PAK" box has chart indicating the number of FLEXCO HD Fasteners to use for given belt widths.



Standard shipping carton contains four "25-PAK" boxes of one size fastener. Keep a supply of "25-PAKS" on hand. Easy to store and inventory, sturdy boxes and shipping cartons have many uses.

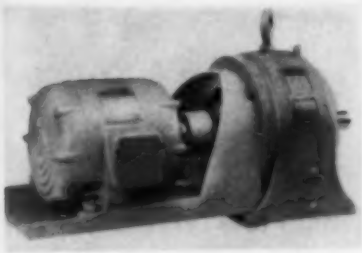
Ask your FLEXCO distributor or write to us for additional information.

Flexible STEEL LACING COMPANY

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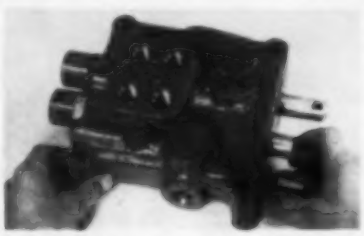
Equipment News (*Continued*)

cording to Caterpillar, this specially-alloyed steel becomes "work hardened" under the continuous pounding of rock or slag particles, resisting wear better than standard steel track shoe. The new shoes are initially ground smooth on the rail side to provide a smooth, secure shoe-rail fit. Manganese grouser shoes for the Caterpillar D-8 and D-9 tractors are available in widths of 22 and 27 in, the standard widths respectively, for both tractors.



Gear Reducer

Louis Allis Co., Milwaukee, has come out with a motorized gear unit called Line-A-Spede. This gear reducer, powered by a standard NEMA-frame motor mounted on an attached shelf, is available for motor ratings of 1 to 75 hp with ratios up to 1,487:1. Units can be obtained for horizontal, vertical, flange, incline, sidewall or ceiling mounting, according to Louis Allis.



Hydraulic Control Valves

Borg-Warner Corp., Wooster Div., Bedford, Ohio, has come out with a new line of hydraulic directional control valves. Nominal ratings from 5 to 25 gpm and up to 6-spool configuration are offered in the new line. Side high-pressure carryover is available for connecting additional valves in series. An additional port can be added with internal straight threads which take an adapter fitting for flared tube connections. The port can be furnished with a plug for removal when an additional valve is to be connected. The new Wooster valves are designed for operating pressures up to 2,000 psi. The open center parallel-circuit design of the valves permits independent or simultaneous operation of cylinders or hydraulic motors.



1959 Chevrolet Tandem

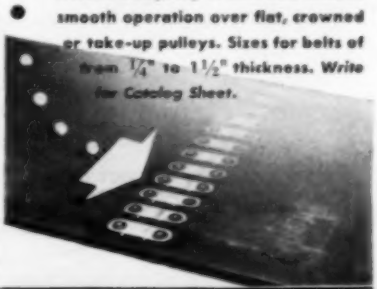
The 1959 line of heavy duty Chevrolet trucks offer many improvements over last year, according to Chevrolet Div., General Motors Corp., Detroit. Two new optional close-ratio, five-speed transmissions, improved power steering, increased durability of rear axles, refinements of the 9,000 lb front axle assembly with full air brakes, and numerous other improvements in body and chassis are claimed by Chevrolet. A new optional power train for 70 and 80 series models includes a larger V-8 and heavier clutch, transmission, and rear axle. Tandem axle assemblies retain the built-in power di-

PLATEGRIP

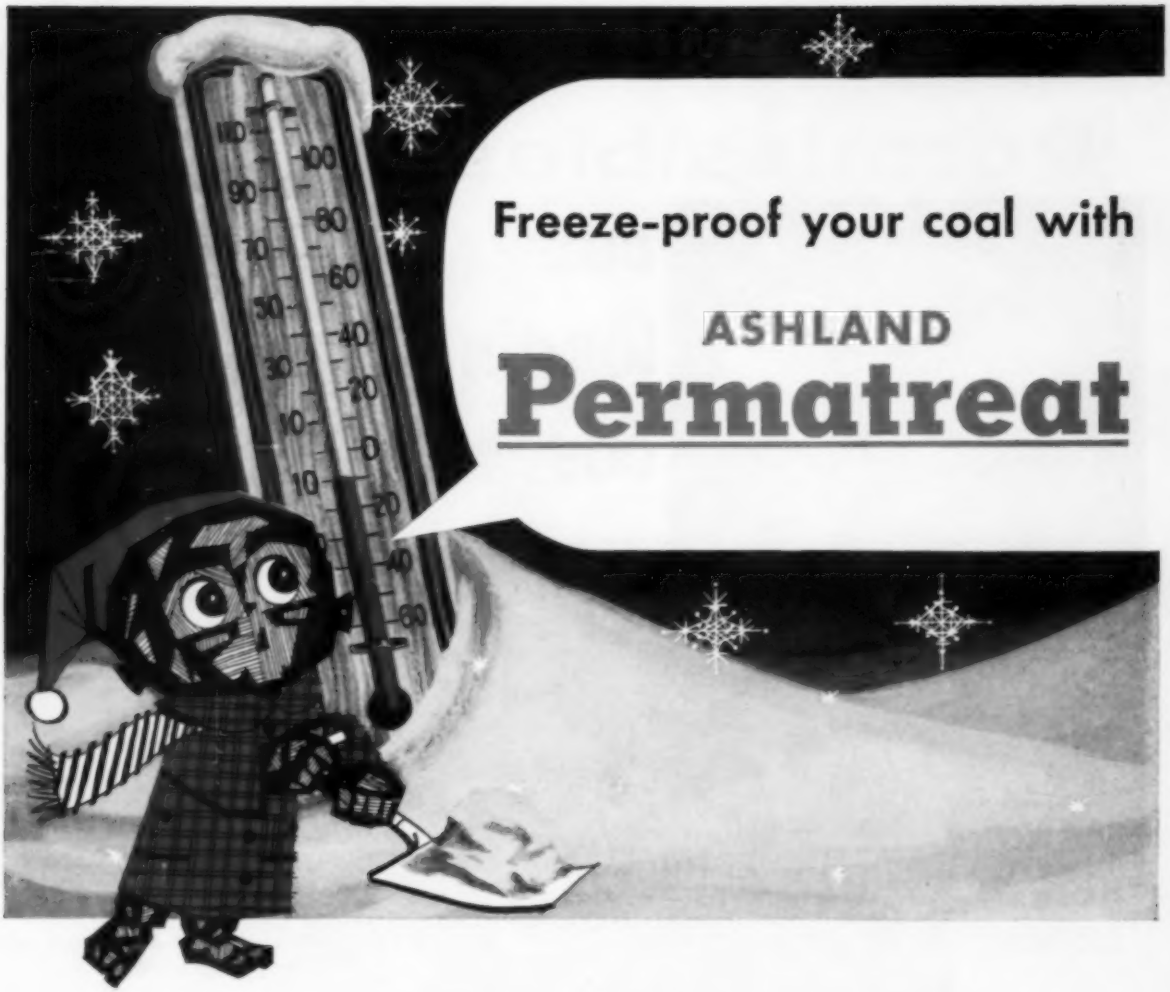
PLATE FASTENERS FOR CONVEYOR BELTS



- Make strong dust-tight, water-tight joints in belts of any width. Special design spreads tension uniformly across belt, allow natural troughing of belt and assures smooth operation over flat, crowned or take-up pulleys. Sizes for belts of from 1/4" to 1½" thickness. Write for Catalog Sheet.



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Freeze-proof, Water-proof, Dust-proof and Corrosion-proof!

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Permatreat is tailored to the specific needs of your coal. Special consultant services—yours for the asking. Just write, wire or phone us.

One Permatreatment lasts the life of the coal!

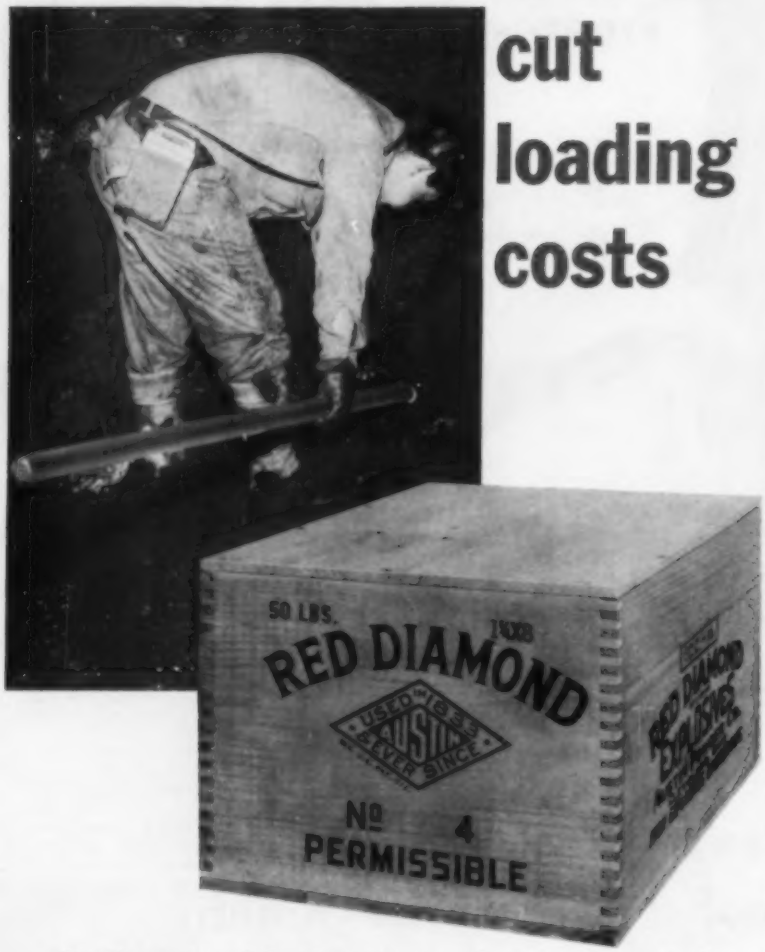
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Loading costs and cleaning expense are important factors in the profit picture of many deep mines. And, they are factors that can be closely controlled through use of the right permissible dynamites.

Austin produces permissibles which solve virtually every problem connected with production of coal. They are available in speeds and strengths that meet such varying conditions as heavy binders, hard rock, thin seams, excessive water, etc.

Your Austin representative will gladly survey your present operation and show you how the correct type of permissible can save you time and money. Call him today or write Austin Powder Company in Cleveland.

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explosives ◆ low grade ammonium nitrates ◆ primers ◆ blasting supplies
detonating fuse and connectors ◆ AP drill heads ◆ mine tools

Equipment News *(Continued)*

vider and auxiliary three-speed transmission as an exclusive Chevrolet design. A 230 hp V-8 engine is standard on 90 and 100 series models.

Electrical Welding Rod

A new type electrical welding rod has been introduced by the Stoody Co., Whittier, Calif. The new rod claims a deposition rate of better than 6 lb per hour at 250 amps. Weldability is excellent, Stoody says, operating either AC or DC, and spatter loss is low. It can be applied in either stringer beads or wash passes. A 2-pass weaved deposit on medium carbon steel shows a Rockwell C hardness of 26; stringer beads on the same base metal give a reading of Rockwell C 33.



Dust Collectors

Two new designs of the "Cyclo-trell" multiple-tube-type mechanical dust collector have been announced by Research-Cottrell, Inc., Bound Brook, N.J. One new arrangement has a side inlet for the uncleaned gases and the other model draws the gas in through the top and exhausts through the side. Prior to this, says R-S, the Cyclo-trell was available with a side inlet and side outlet only. R-S says the cyclone tubes developed 2 yr ago and still used in the units have a higher collection efficiency and a greater capacity rating than conventional multiple-tube collectors. The greater capacity rating permits the use of fewer tubes per installation. Both new designs are available in various capacities. The largest in use currently is an eight-unit installation of 1,760 tubes treating 1,440,000 cfm.

New Bug Duster

National Mine Service Co., Clarkson Div., Pittsburgh, is introducing a new type bug duster. Mechanically operated from the main motor drive, the unit is designed to relieve the hydraulic system, and to provide greater reliability in conveying dust away from the cutting

WHERE THE GOING GETS ROUGH...

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■ Wherever rock and gravel, coal and ores come in violent contact with machine and equipment parts, Lukens "T-1" steel—*especially extra tough 321 min. BHN quality*—fights back at wear and abrasion with spectacular success.

It is readily fabricated. You can form or weld it in the field or shop, from stock plate sizes immediately available. It can be used to replace or repair worn bucket teeth, truck and mine car bodies or liners, dozer blades, dipper sticks, crusher teeth, chutes, and many other parts.

Far stronger for its gage than conventional steel, it requires less metal to do equivalent jobs. It remains tough even at sub-zero temperatures.

Contact your nearest warehouse listed below, or write Manager, Marketing Service, 140 Lukens Building, Lukens Steel Company, Coatesville, Pennsylvania. Ask for special bulletin, *"Lukens 'T-1' for Toughness."*

WAREHOUSES

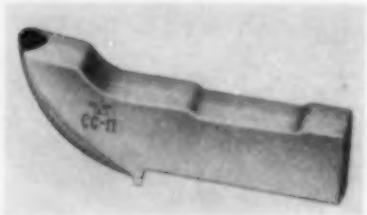
Ashland, Kentucky, Mansbach Steel Co., 19th St. & River Front
Baltimore 2, Maryland, Wm. G. Wetherall, Inc., 317 President Street
Birmingham 2, Alabama, O'Neal Steel, Inc., P. O. Box 2623
Cleveland 6, Ohio, Mills-Wolf Steel Co., 10006 Carnegie Avenue
Los Angeles 33, California, The R. J. M. Company, 238 Mission Rd.
Montreal, Quebec, Can., Drummond, McCall & Co., Ltd., 930 Wellington St.

HELPING INDUSTRY CHOOSE STEELS THAT FIT THE JOB



Equipment News *(Continued)*

chain. The operational advantages claimed for the bug duster are that it eliminates a very heavy circulation of oil and results in less heating, foaming and leakage of the oil regularly used for other purposes on the machines. The Clarkson duster is available with either 8 or 6 in auger, or may be adapted to the auger supplied with the cutter.



Bit With a Lasting Tip

Tip loss is drastically reduced says General Electric Co. Metallurgical Products Dept., Detroit, in describing its new 1½ in gage machine bit. GE says the carbide tip of the bit is enclosed in steel and retained both by brazing and mechanical holding, thus reducing tip loss and minimizing downtime. Reduced tool overhang and the "enclosed cylinder" tip reduce breakage with the bit design taking full advantage of the traditional high compressive strength of Carboloy cemented carbide. The shorter 1½ in gage reduces leverage of the cutting forces which cause shank bending or breakage.

Equipment Shorts

BULK BIN LEVEL CONTROL—A new Bin-Vue level indicator and control that features an easy-off cover, and a fail safe device has been announced by Convair, Pittsburgh. A limit switch, acting as a fail safe device, is activated 18 times per min. It can be connected for visible or audible control, and to a relay circuit for automatic control. In operation, a 1/100 hp motor turns a 4-blade paddle at 9 rpm by means of a torsion spring. When material makes firm contact with the paddle, the paddle stops. The motor keeps running, turning the spring until it activates the limit switch. The switch kicks off the motor and any other equipment attached to it. As soon as the paddle is clear, the torsion spring reactivates the paddle, which starts the motor; putting the entire unit into operation again.

TONG TEST AMMETERS—Eight types of AC-DC tong test ammeters are now available, according to Columbia Electric Mfg. Co., Cleveland. Columbia says the Tong Test, the only one of its type to

Here's A Repair Job You Can't Tell From New Equipment



. . restored to original condition
. . at lower cost . . by LEMAN MACHINE Co.

Yes, Leman rebuilds mining machinery to original condition . . . frequently adds modifications making old equipment better than new . . . for less than the cost of maintaining your own shop. A modern, fully equipped machine shop . . . a full time staff of specialists . . . 35 years a leader in heavy equipment repairs . . . use of genuine OEM replacement parts only . . . sound, economical reasons why Leman Repair Services are worth your investigation. Look at the cost chart below . . . two cost items involved for Leman guaranteed repairs versus ten items for your own shop . . . and one quick phone call to Leman eliminates all the production problems of handling your own repairs.

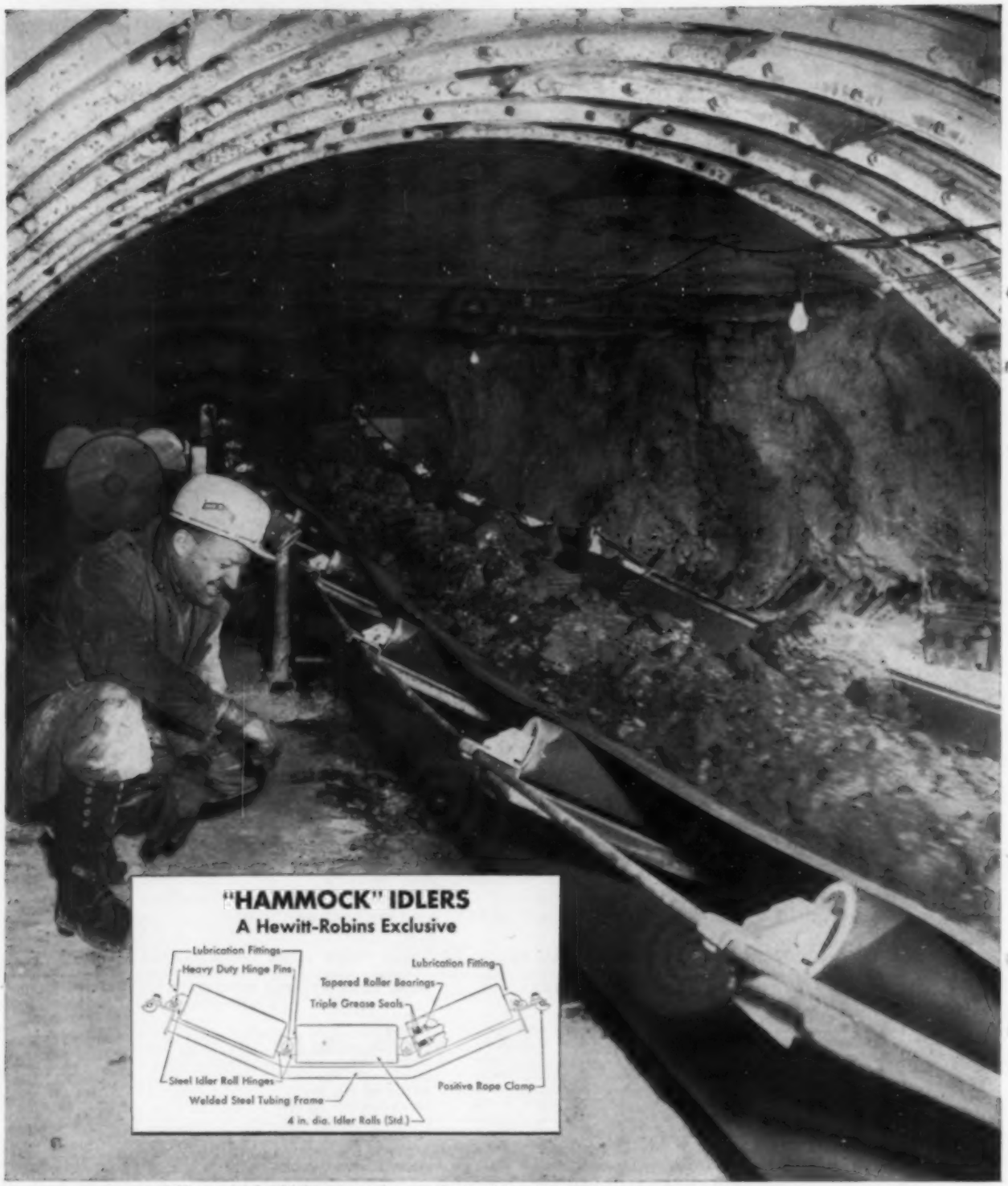
COMPARISON SHOWS LEMAN COSTS ARE LESS THAN YOUR OWN REPAIR SHOP

HERE'S WHAT LEMAN REPAIRS COST YOU (Per Man Hour)		NOW LOOK AT COSTS INVOLVED IN YOUR OWN SHOP (Per Man Hour)	Insert your rates
LABOR	Submitted on Request	LABOR	$
CLERICAL WORK	None	CLERICAL WORK	
EQUIPMENT	None	EQUIPMENT	
EMERGENCY PURCHASES	None	EMERGENCY PURCHASES	
ORDERING DELAYS	None	ORDERING DELAYS	
REPLACEMENT PARTS	LIST PRICE	REPLACEMENT PARTS	LIST PRICE
TRANSPORTATION	None	TRANSPORTATION	
POWER	None	POWER	
ACETYLENE, OXYGEN, etc.	None	ACETYLENE, OXYGEN, etc.	
SHOP MAINTENANCE	None	SHOP MAINTENANCE	
Total Cost Per Man Hour—2 Items		Total Cost Per Man Hour—Ten Items	

Leman Repair Service Includes Fast Pick-up and Delivery Right To The Job Site. Phone or Write for Prompt, Courteous Service.

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Self-contained, with its own anchor stands, the "Rope Stringer" conveyor can be used with any head or tail equipment.



"ROPE STRINGER"

The last word in low-cost, high-capacity, easy-to-handle conveyors

See how Hewitt-Robins has made the "Rope Stringer" conveyor easy to handle, economical to buy, simple to install and operate!

The "Rope Stringer" conveyor consists of simple support and anchor stands, the supporting wire ropes, Hewitt-Robins exclusive "Hammock" idlers, and Hewitt-Robins conveyor belt. The conveyor can be extended by a small crew and can be dismantled and set up in a new location in a fraction of the time required by rigid conveyors!

With this "Rope Stringer" conveyor, spillage is greatly reduced. Thanks to the catenary action of the "Hammock" idlers, spillage is less than one third that of a rigid deck conveyor. And safety is increased, too—the "Hammock" idler and frame assembly can be quickly removed or replaced as a unit, with the belt in place!

"Rope Stringer" Conveyor Advantages

Valuable features incorporated into this new Hewitt-Robins rope conveyor are made possible by the use of flexible supports and a unique "Hammock" idler arrangement. These give several major advantages:

Easy Installation

- Idlers are quickly skidded into position between belt strands.
- Trougher spacing is readily varied to suit conditions.
- Anchor stand assemblies can be bottom or roof mounted.

Better Operation

- Minimum spillage—load and belt are continuously centered by catenary action of hinged "Hammock" idlers.
- Longer belt life through cushioning action of "Hammock" idlers.
- Rounded idler frame protects return belt at points of severe dip.
- No training idlers required.
- Level travel assured because either leg of stand can be adjusted for height.

Provision for Relubrication

- Triple-sealed bearings can be easily relubricated.

Simple, Sturdy Construction

- Strong, welded tube spreader frame.
- Substantial, long-life link and hinge design idler rolls.
- 4, 5, or 6 in. idler rolls available.
- Removable link pin for idler roll replacement.

Maximum Safety

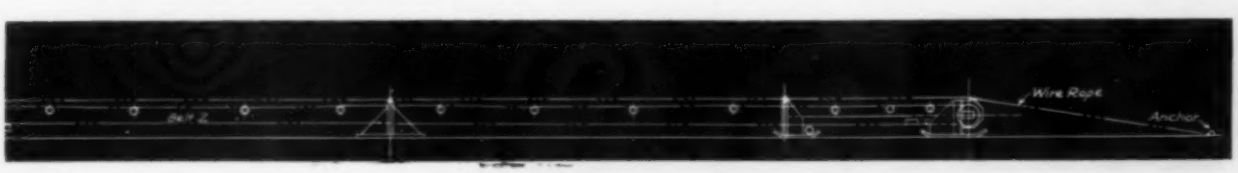
- Idler rolls and frame positioned as a unit.
- Double spreader prevents idler rolls from dropping onto return belt.

See for yourself how this new "Rope Stringer" conveyor can pay for itself promptly in *your* operations! Only Hewitt-Robins provides all the advantages of the "Rope Stringer" conveyor—*complete* with the H-R belt of your choice! For further details, consult your Hewitt-Robins representative.

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THE NAME THAT MEANS EVERYTHING IN BULK MATERIALS HANDLING SYSTEMS...

CONVEYOR BELTING AND IDLERS • POWER TRANSMISSION DRIVES • INDUSTRIAL HOSE • VIBRATING CONVEYORS, SCREENS & SHAKEOUTS





Promote Safety with
Mine Power Control

A NEW FEMCO CONTROL SYSTEM

WHEN ANY FAN STOPS ALL POWER IS REMOVED FROM MINE

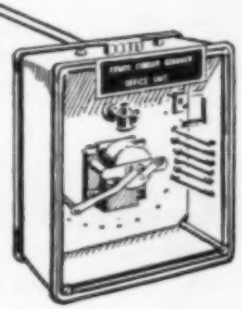
When any fan stops, all power is removed from mine, automatically. If desired, the system will shut down all fans and lock them out to be re-started when safe. Also, all fans can be remotely controlled from a central location.

Using a single pair of wires only, the system provides automatic opening of all circuit breakers in event of fan failure and also provides manual or automatic on-off operation of all circuit breakers. From a central control cabinet up to 22 locations including the fans, may be synchronized in a single system.

UP TO 22 LOCATIONS WITH ONLY ONE PAIR OF WIRES



GET THE FACTS—
ASK A FEMCO SALES ENGINEER



At the heart of each basic system are ingeniously designed Femco Circuit Scanner units which may be used for many different control applications. They are low in cost, easy to install with only two wires and are extremely reliable in day in, day out operation.

UNderhill 3-3200 Femco, Inc. IRWIN, PA.

COMMUNICATION • Electronic Engineers • AUTOMATION

Equipment News (*Continued*)

measure both AC and DC, has a larger damping chamber for each scale range to make easier reading. Other new features are heavier and stronger range scale construction, insulated operating trigger, and plastic handle. The Tong Test gets the reading without breaking the circuit or insulation. It measures up to 1,000 amperes.

LIQUID LOCKWASHER—A liquid lockwasher that fits all sizes and types of threaded fasteners is the claim of the Loctite sealant, made by American Sealants Co., Hartford, Conn. One drop of the thin, liquid polymer does the job of any ordinary lockwasher. The sealant, hardens into a heat- and oil-resistant bond, says American. In addition, American says Loctite is widely used to seal high pressure hydraulic lines.

VIBRATORY FEEDER—The new model F-010 electromagnetic vibratory feeder offers fast, high-capacity, rate-controlled feeding of bulk materials, according to the maker, Syntron Co., Homer City, Pa. The electromagnet drive produces 3,600 vibrations per min. Its rheostat control affords instantaneous, easy finger-tip adjustment of feed rates from a slow dribble flow to a maximum capacity of 3 tph. The unit will operate on 115 or 230-V AC.

NEW TORCH—A new model Arcair torch, H-2, has been developed by the Arcair Co., Lancaster, Ohio, to replace their model C-2 torch. One of the most outstanding features of the new H-2, says Arcair, is a positive air control valve in the torch handle. By holding the air orifice in the head of the H-2 within 4 in of the work, the torch can be operated on as low as 40 psi of compressed air.

SYNTHETIC CHAIN LUBRICANT—Lehigh Chemical Co., Chestertown, Md., is now marketing a synthetic chain lubricant they claim will overcome many of the problems associated with chain lubrication. Called Anderol L-732, the lubricant is a tacky, semi-fluid grease. It will flow to some extent, says Lehigh, but it retains a gel structure that lubricates as a grease, giving longer effectiveness. Also, being tacky, it resists wipe-off, throw-off, run-off, and will stay effective from 6 mo to over a year. Lehigh claims L-732 will not gum, and that it penetrates quicker than oil.

ENCLOSED MOTOR GASKETS—Two improved gasket designs for enclosed motors have been developed by the Small Integral Motor Dept., General Electric Co., Schenectady, N. Y. For standard enclosed motors, the company has an improved cork-neoprene gasket, used between the conduit box and frame. Se-

Designed, Engineered and Built

for efficient, economical operation...



and to produce a better quality coal

your Roberts & Schaefer Plant

There's one *sure* way to get exactly what you want when you plan your new coal cleaning plant.

Call on Roberts & Schaefer engineers to make an analysis of your requirements. They will design a plant with the capacity and flexibility you need . . . a plant with cleaning facilities engineered specifically to prepare your coal to satisfy the demands of your market . . . a plant that will operate efficiently and economically. Many of the industry's most significant advances in plant design and coal preparation facilities were developed by Roberts & Schaefer.

Roberts & Schaefer provides a complete service covering initial process studies, design and engineering, installation and construction.

ENGINEERS & CONTRACTORS

ROBERTS & SCHAEFER Company

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NEW YORK 19, N.Y. • PITTSBURGH 22, PA. • HUNTINGTON 10, W. VA. • ST. PAUL 1, MINN.

how to make your own

mine roof jacks



1. Duff-Norton supplies the head and handle.
2. You supply the pipe to fit your desired height.
3. Add the desired Duff-Norton base and you have the perfect mine roof jack.

Here's all you do—(1) cut any 2-inch standard steel pipe into lengths desired and (2) attach safe, strong, dependable Duff-Norton head, handle and base fittings. That's all!

You choose the type of heads, handles and bases best suited to your particular needs. They are available in a variety of types in both 8 and 16-ton capacities (16 ton requires 2-inch *extra strength* pipe). All fittings are painted light grey for better visibility.

For complete information on Duff-Norton mine jacks, see your local distributor or write the world's oldest and largest manufacturer of lifting jacks for your free copy of catalog AD-10J, "A Handy Guide for Selecting Duff-Norton Mine Jacks." This catalog contains complete information not only on mine roof jacks but other popular Duff-Norton jacks for useful trouble-free service in and around coal mines.

DUFF-NORTON COMPANY

P. O. Box 1889 • Pittsburgh 30, Pennsylvania

COFFING HOIST DIVISION • Danville, Illinois

DUFF-NORTON JACKS
Ratchet, Screw,
Hydraulic, Worm Gear

DUFF-NORTON

COFFING HOISTS
Ratchet Lever
Spur Gear, Electric

Equipment News (*Continued*)

vere-duty motors will be equipped with a gasket made of pure neoprene with formed sleeves that grip leads tightly to seal out corrosive materials, water, and fine abrasive dusts. GE engineers say the new gasket is impervious to cutting fluids.

FOAM TRACTOR SEATS—Urethane foam, which is lightweight, strong, and resilient, is now being used to cushion tractor seats produced by Massey-Ferguson, Inc., Detroit. Massey-Ferguson reports the foam has withstood extensive testing. In one 2-yr weathering test, the foam did not crumble or deteriorate in any way. The foam cushion is in one molded piece to fit the natural contours of the body. It is covered with a washable and removable vinyl duck.

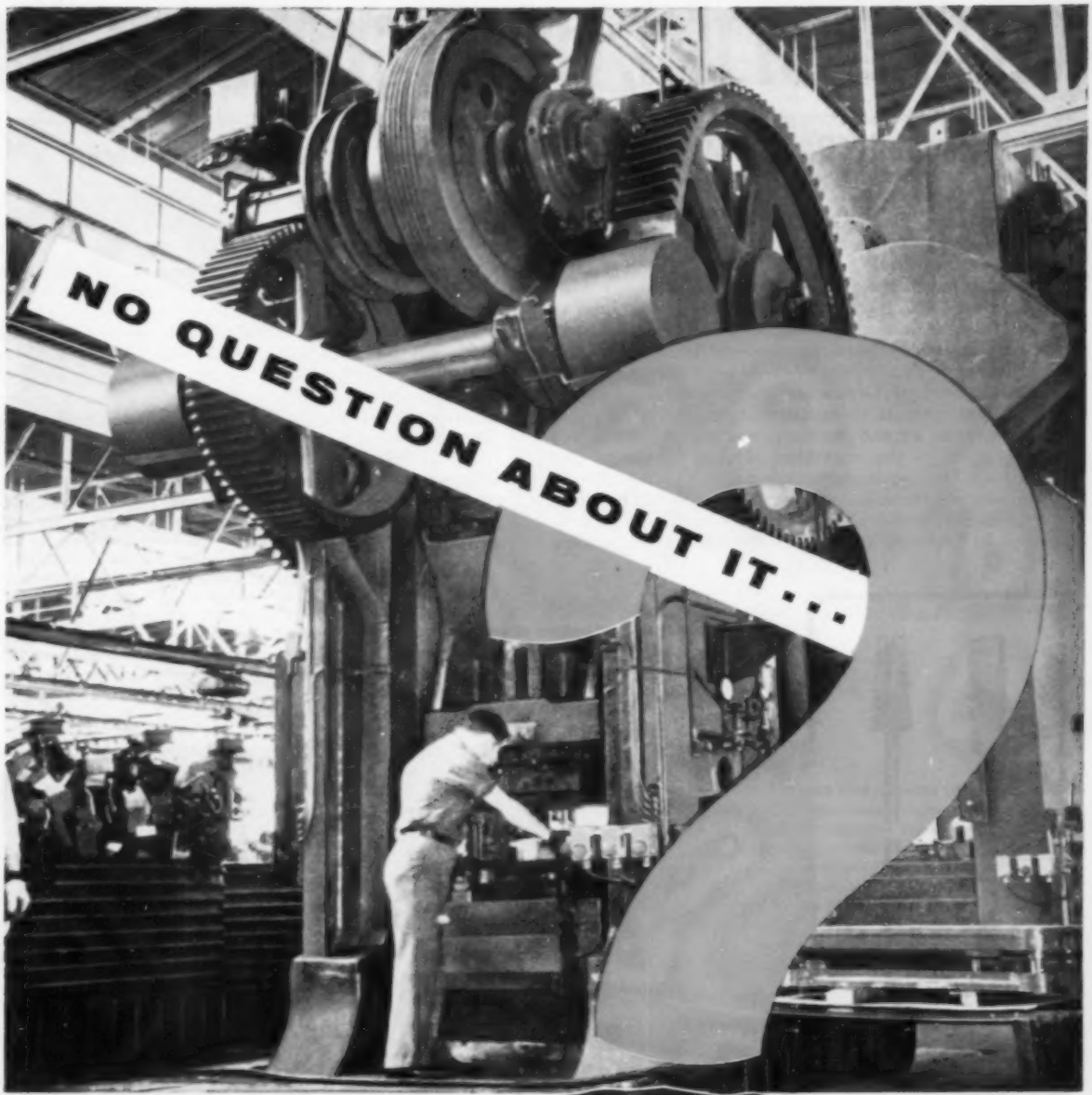
CIRCUIT SCANNERS—Femco, Inc., Irwin, Pa., has announced newly designed AC or battery-powered circuit scanners for safe and efficient supervisory control of sub-stations. Because the control equipment is powered from a separate source independent of the equipment being monitored, systems are safer to use with little chance of simultaneous power failure, Femco reports. Using a single pair of wires, any number of stations may be wired to a central control cabinet in a single system. The system will provide supervisory control with manual or automatic on-off operation of all circuit breakers in sub stations.

CONTOUR SAWING—The DoAll Co., Des Plaines, Ill. has developed a new model contour sawing machine. According to DoALL, their new machine is versatile, will machine any material encountered, is fast, and is safe and easy for workers to use. The new machine, model 16M, has a speed range of 50 to 5,200 fpm with a built-in job selector to use as guide in determining the correct speed for the material being worked. Operator fatigue is eliminated by foot controlled power feed.

Free Bulletins

GENERATOR SET—Highlights of design, engineering and construction features of the recently-introduced Allis Chalmers G-226 portable generator set are covered in a new catalog, BU-412, from the Engine-Material Handling Div., Allis-Chalmers Mfg. Co., Milwaukee. Photographs and cutaway drawings show applications, and the important components of the generator. Specifications also are included.

STATIONARY BATTERIES—C&D Batteries, Inc., Conshohocken, Pa., has released a new bulletin, CP-540, that covers the use, design, and construction of



Bituminous is the dependable fuel for B&O *plant power*

- Is it readily available?—*Yes, it's yours on order!*
- Is there enough for any future need?—*Sure thing, the supply is practically limitless!*
- How about present and future cost?—*Price is stabilized by expanding mine mechanization and increasing efficiency of modern burning equipment.*

B&O

BITUMINOUS COALS FOR EVERY PURPOSE

Ask our man! BALTIMORE & OHIO RAILROAD, BALTIMORE 1, MD., Phone: LExington 9-0400

CERTIFIED BY TEST, PROVED BY PERFORMANCE

Republic Roof Bolts Assure Consistent Top-Holding Power

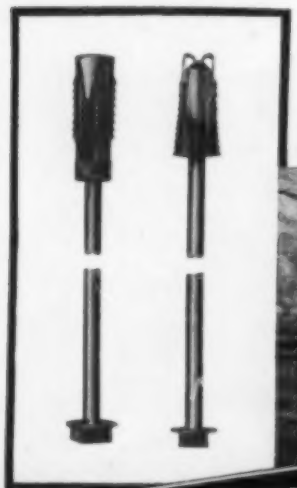
When you specify Republic Mine Roof Bolt Assemblies, you get two-way assurance of uniformly superior top-holding power.

First, Republic's exclusive Certification Program is direct evidence of the high standards maintained to protect roof bolt quality. Samples of every heat of steel used are tested to destruction to establish finished bolt performance. The results of these tests are entered on Material Control Certificates which accompany all roof bolt shipments, demonstrating that physical properties meet or exceed the suggested mining standards as approved by the American Mining Congress and American Standards Association.

Second, a continuous field-testing program to verify performance under actual service conditions is conducted in Republic's own mines. Before a new design is marketed, it must pass these tests. Complete data are assembled concerning its effectiveness in various types of strata using different methods of placement and spacing. Moreover, records are maintained to establish long-term performance.

In addition to laboratory and field testing, Republic helps you increase roof-control reliability by offering the most complete selection of roof bolt assemblies available from a single manufacturer. Wherever roof bolting is practical, Republic can furnish the type and size best suited to overhead conditions.

All of these facts make Republic Roof Bolt Assemblies your best choice for uniform top-holding power throughout your bolted-roof areas. For further information, contact your Republic representative or mail coupon.



PERFORMANCE RELIABILITY OF REPUBLIC ROOF BOLTS is proved by both laboratory and in-service testing. Result is better-than-ever roof control through new and improved designs. Republic's latest and most versatile shell designs are shown on square-head bolts at left. Extreme left is RE-2 expansion shell for use in relatively soft rock. RE-3, at right, is well suited to harder formations. The RE-2 can be shipped assembled with the bolt or in separate components.



BOLTED ASSEMBLY PERFORMANCE can be no better than the fasteners used to hold it together. This is the reason it pays to specify REPUBLIC Bolts and Nuts. 20,000 standard and 8,000 special types and sizes are available to meet practically any requirement. Each is a product of integrated manufacturing control extending from ore mining to final inspection. Result is uniform high quality . . . the basis for absolute dependability. For facts, mail coupon.

REPUBLIC'S NEW TRUSCON STEEL BUILDINGS PERFORM WELL as permanent or temporary shelter for mine personnel, equipment, or material. These "Budget Buildings" are delivered as a complete package including roofing, siding, windows, doors, and hardware. They are easy to erect or dismantle and re-erect to meet changing needs. Sizes include 32-, 36-, 40-, 44-, and 48-foot widths; 12- and 14-foot heights; and any required length. Parts are galvanized to eliminate painting. Send for data.





REPUBLIC PLASTIC PIPE PROVIDES TOP PERFORMANCE in handling mine water disposal problems. Both Flexible Polyethylene and Semi-Rigid Kralastic Pipe are available to satisfy a very broad range of applications. Both are lightweight and easy to handle, cut, and join. Made of chemically inert materials, Republic's Plastic Piping is impervious to acids, alkalies, metallic salts, and other corrosive wastes found in mine water. Send coupon for details.

REPUBLIC STEEL

World's Widest Range of Standard Steels and Steel Products

REPUBLIC STEEL CORPORATION
DEPT. CA-5523-R
1441 REPUBLIC BUILDING • CLEVELAND 1, OHIO

Please send more information on:

- ☐ Mine Roof Bolts
- ☐ Truscon Steel Buildings
- ☐ Bolts and Nuts
- ☐ Plastic Pipe

Name_____ Title_____

Company_____

Address_____

City_____ Zone_____ State_____

custom
built

ENSIGN
mine type
STARTERS

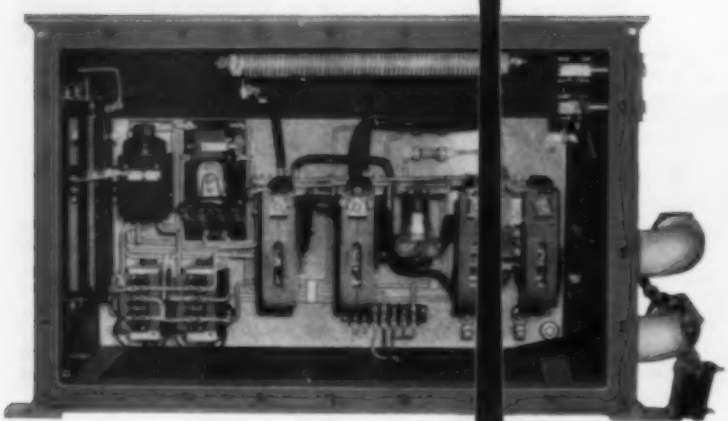


Photo illustrates Ensign Bulletin 5391 magnetic reduced voltage starter — 250 Volt D.C. — 3 points acceleration — non-reversing — Bureau of Mines explosion tested enclosure.

features -

ENSIGN type EJ contactors

ENSIGN mercury timing relays

ENSIGN intrinsically safe relay

ENSIGN
ELECTRIC AND MANUFACTURING CO.

914 Adams Avenue Huntington 4, W. Va.

Equipment News *(Continued)*

the firm's line of PlastiCal lead-calcium grid batteries. C&D says PlastiCal batteries have a life expectancy of 25 yr in control, switchgear, auxiliary power, and other stationary battery applications. The bulletin includes complete cell data on the entire line from 40 to 1,650 ampere hour ratings, curves on discharge characteristics, rack data, accessory details, and a listing of the company's service and sales offices.

COAL HANDLING METHODS—The increased importance of coal handling equipment in relation to overall plant design is discussed and illustrated in bulletin A-2029, just issued by the Link-Belt Co., Chicago. The bulletin describes and illustrates methods of handling coal at steam generating plants (large and small), barge and railroad car unloading facilities, storage and reclaim, conveying and elevating, crushing, weighing, sampling, distribution to bunkers, and dust control.

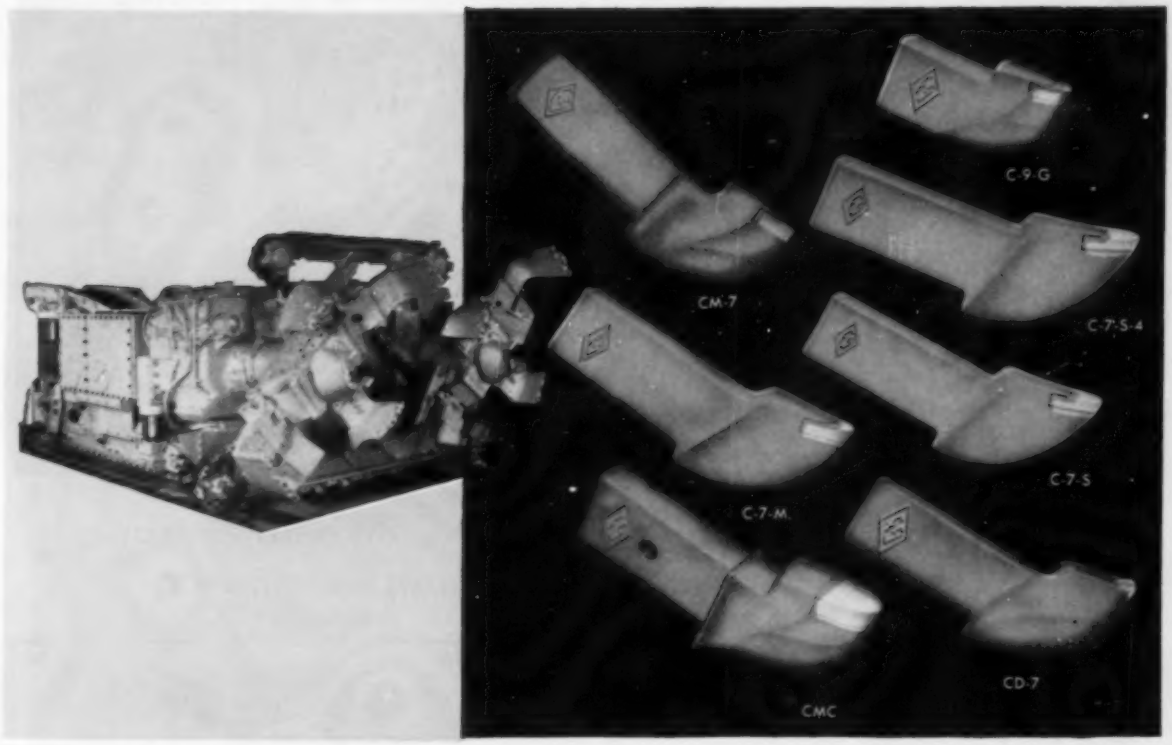
ROTARY DRUM FILTER—Dorr-Oliver, Inc., Stamford, Conn., has a new bulletin on rotary drum filters. Entitled "The Oliver Continuous Rotary Drum Filter for the Process Industries", the bulletin describes the designs of the five principal types of rotary drum units and their component parts, and details conventional accessories, auxiliaries, media, and materials of construction. Bulletin 7200 also includes fifty photographs, and line and wash drawings of various filters and components, as well as tables of sizes and capacities of each design.

RAIL, TRACKWORK CATALOG—A 128-page "West Virginia" brand rail and trackwork catalog is being distributed by Connors Steel Div., H. K. Porter Co., Inc., New York, N. Y. The trackwork section of the catalog includes frogs, switches, switch stands, turnouts, guard rails and ties. The catalog features light rails from 8 to 60 lb and a complete line of trackwork accessories. A special chapter is devoted to layout diagrams and data to aid in expansion planning and replacement of worn materials.

ROTARY BLOWERS, PUMPS—Sutorbilt Corp., Compton, Calif., gives full details on continuous-service rotary positive pressure blowers, gas and vacuum pumps in its new bulletin S65C. Photographs and cutaway drawings illustrate the blowers and pumps, which are designed to handle volumes of air or gas from 1,000 to 20,000 cfm, and pressures and vacuums up to 10 psig single stage. A section of the bulletin explains operating principles, and lists 24 applications showing typical uses.

DESIGN FOR PROGRESS—The Western

FIRTHITE Blue-Bit MINING TOOLS



Used on *GOODMAN* Continuous Borers for every mining condition

Firthite carbide inserts give Goodman Continuous Borers the "bite" that helps provide a steady flow of coal back from the working face —maintaining a high level of face efficiency and delivering more tons per shift at low cost per ton.

And because the FIRTHITE Blue-Bit line provides a full complement of cutting tools you can select the *right* tools and corresponding holders to suit working conditions in your field.

Consult the condensed table at the right for recommended tools or, if special conditions prevail, a Firth Sterling mining tool engineer will be glad to discuss the problem with you.

RECOMMENDED TOOL NUMBER			Cutting Conditions	Coal	Holder
Bore Arms	Chain	Clearance			
C-7-S CD-7	C-7-S	C-9-G	Light to Medium	Relatively Clean	½ x 1
C-7-M C-7-S-4 CM-7	C-7-S	C-9-G	Medium to Heavy	Occasional Impurities	½ x 1
CM-7 CMC	C-7-S-4 CD-7	C-9-G	Heavy	Large Quantities Rock Sulphur, Rolls	½ x 1

"Your Future is Great in a Growing America"

YOUR AUTHORIZED FIRTH STERLING MINING DISTRIBUTORS HAVE COMPLETE STOCKS FOR IMMEDIATE DELIVERY.

Firth Sterling

—INC—

GENERAL OFFICES: 3113 FORBES ST., PITTSBURGH 30, PA.

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AUSTIN POWDER COMPANY—Cleveland, Waynesburg, Evansville, Madisonville, Hazard, W. Frankfort, Clarksburg
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THE RAINS SUPPLY CO.—Salt Lake City
SOUTHWESTERN ILLINOIS SUPPLY—DeSoto
COAL BIT COMPANY—Prestonsburg

PRODUCTS OF FIRTH STERLING METALLURGY

High Speed Steels
Tool & Die Steels
Stainless Specialties
High Temperature Alloys
Sintered Tungsten Carbides
Firth Heavy Metal
Chromium Carbides
High Temperature Cermets
Zirconium





What Electrical Connectors would you choose ...for these installations?

Modern mining techniques allow little time for coddling men or equipment . . . so it's a safe bet your answer to the question in our headline will be based on more than just the electrical requirements of the equipment. Such important considerations as safety, efficiency, durability and maintenance cost, will influence your selection. *This is as it should be and we're glad it's true* . . . for the mining industry's constant search for the best available equipment has made JOY Electrical Connectors their preferred choice since 1928.

Why settle for less . . . when the best costs less in the long run?

JOY plugs and receptacles are specifically designed to provide long-range, maintenance-free service under the most adverse operating conditions . . . and they're available in styles and sizes to meet every mining need. Two of the currently *most popular* designs for mining installations are illustrated at right. Equipped with non-corrosive metal couplings and flame-resistant Neoprene bodies, both are moisture-tight, shatter-proof and distortion-resistant.

Straight Pin Bigun (SPB)—Have threaded metal couplings. Plugs are factory-vulcanized to 36" cable leads or to lengths as specified. See Bulletin B39a for complete information.

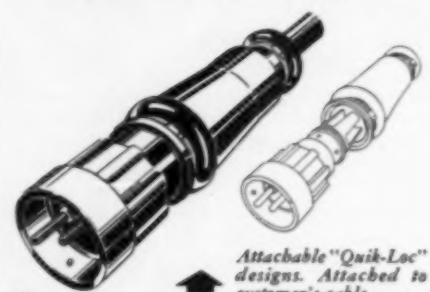
Attachable "Quik-Loc" styles—Attach quickly to customer's own cable. Newly designed couplings completely engage or disengage in ¼ turn. See Bulletin B57 for complete details.

JOY plugs and receptacles are available for both AC and DC applications. In addition, "SPB" and "Quik-Loc" connectors may be supplied with pilot control contacts for *permissible operation* when used in conjunction with JOY'S Bureau of Mines-Approved distribution centers (SCC units). Ask us for complete information, ***Joy Manufacturing Company, Electrical Products Division, 1201 Macklind Ave., St. Louis 10, Mo.*** Executive Offices: Henry W. Oliver Building, Pittsburgh, Pa.



Molded-to-cable "SPB" designs. Have threaded couplings.

Ask for Bulletin B39a.



Attachable "Quik-Loc" designs. Attached to customer's cable.

Ask for Bulletin B57.

W&D CD5447

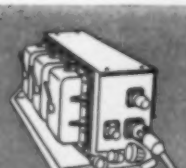


Consult a Joy Engineer

JOY

SPECIALISTS IN CREATING ELECTRICAL CONNECTORS FOR MINING AND INDUSTRY SINCE 1928

Write for information on these JOY products



Safety Circuit Centers



Distribution Boxes

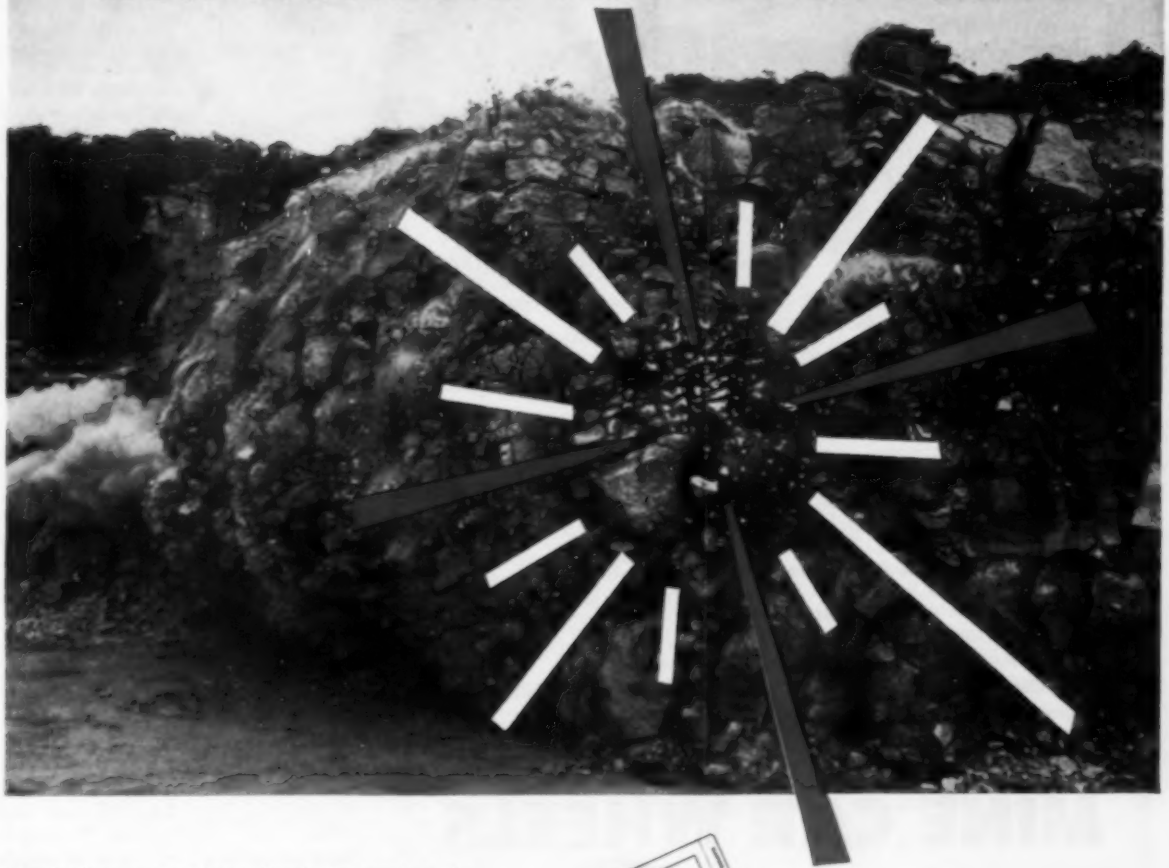


Portable Lighting



New Cable Vulcanizer

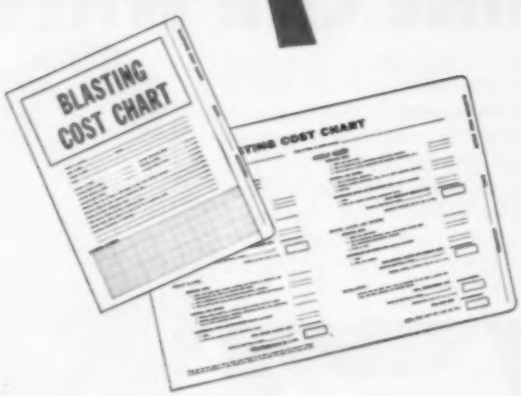
HOW MUCH DID THIS BLAST COST?



Explosives costs alone don't determine the value of a given blast. The explosives you use have a direct effect on the whole operation: drilling, digging, hauling and crushing.

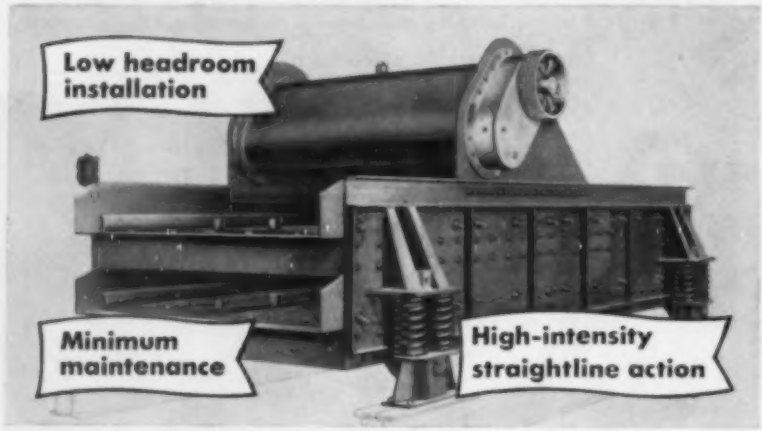
You can find out, quickly and easily, the true, complete cost on any blast by using the new, simplified computing method developed by Atlas. It's called the Blasting Cost Chart, and it's yours without cost or obligation.

Use this new method to learn your real blasting costs. It will help you plug profit leaks and come out money ahead in your blasting. Your nearest Atlas representative will show you how the chart works, and you can keep the actual figures within your own organization.



EXPLOSIVES
DIVISION
ATLAS
POWDER COMPANY
WILMINGTON 99, DELAWARE
offices in principal cities

NEW LINK-BELT STRAIGHTLINE horizontal vibrating screens



For dewatering, washing and sizing of materials—Link-Belt Straightline horizontal vibrating screens assure maximum capacity for size of screen cloth.

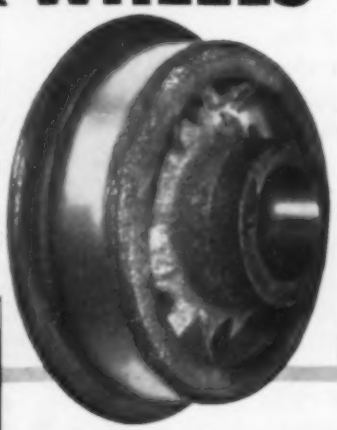
A centrifugal force, unbalanced shaft vibrator produces the high-intensity motion necessary for efficient separation. Suspension or floor mounted, these lower profile units can be installed in locations where headroom is limited. To learn more about the benefits of horizontal screening, call or write your nearest Link-Belt office.

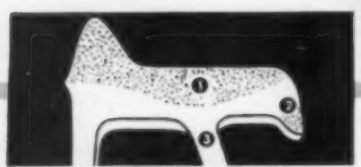
LINK-BELT
VIBRATING SCREENS

LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants and Sales Offices in All Principal Cities. Export Office, New York 7; Australia, Marrickville (Sydney); Brazil, Sao Paulo; Canada, Scarboro (Toronto 13); South Africa, Springs. Representatives Throughout the World. 14,670

acf Load-support MINE CAR WHEELS

Quick-chilling after casting gives acf Chilled Tread Car Wheels extra resistance to abrasion and wear, gives you real economy through long service life. Gray iron center costs less to mount, reduces vibration and effects of stress concentration. Curved plates support tread at load center: minimize damage to treads.





Cross Section of acf "Load Support" Mine Car Wheel showing: (1) uniform depth of hardening, (2) extra heavy overhang, (3) support at center of tread.

For further information, just ask your acf representative.

AMERICAN CAR AND FOUNDRY
DIVISION OF ACF INDUSTRIES, INCORPORATED
750 THIRD AVE., NEW YORK 17, N. Y.

Sales Offices: New York • Chicago • St. Louis • Cleveland • Washington • Philadelphia • San Francisco
Berwick, Pa. • Huntington, W. Va. • Plants: Berwick, Pa. • Huntington, W. Va. • St. Louis, Mo.

Equipment News *(Continued)*

Knapp Engineering Co., San Francisco, has just published "Design for Progress," a 32-page illustrated booklet outlining its approach to the design and construction of modern industrial installations. It describes the WKE methods of project development, project management, design and engineering, and plant construction.

TRACTOR TRACK SHOES—Caterpillar Tractor Co., Peoria, Ill. gives a comprehensive discussion of track shoes in its new bulletin, "A Caterpillar Specialty." Charts show optimum time at which grousers should be built up, and torque specifications are listed for the correct tightening of hardware. Tips are given for the selection of track shoes for special applications.

FLOW SWITCHES — McDonnell & Miller, Inc., Chicago 18, covers its complete line of flow switches and their application in its new Bulletin FS-1. The switches respond to flow of liquid in a pipeline to make or break an electrical circuit. The switches are mounted on the pipeline, and extend a paddle down into the flow. When flow in the line starts or stops, movement of the paddle operates the switch. The switches can be used to light signals, sound alarms, start or stop motors, burners or metering devices.

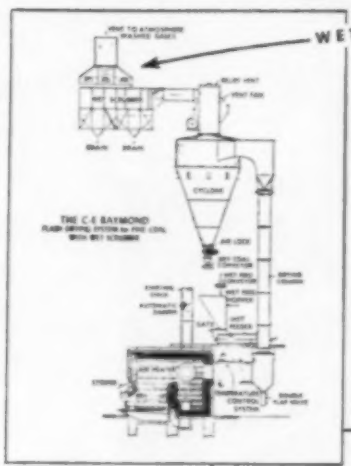
OPEN-TYPE MOTORS—"Super Seal" open-type motors suitable for many applications previously requiring enclosed designs are described in a new bulletin available from Allis-Chalmers Mfg. Co., Milwaukee. Available in all integral horsepower frames, the motors are unaffected by moisture, dust, dirt, oils, acids, and alkalies, says Allis-Chalmers. The motors have an encapsulated stator design in smaller sizes and "Silco-Flex" insulation in larger sizes, both of which result in maximum protection. In addition to lower cost as compared to totally-enclosed, fan-cooled designs, Allis-Chalmers says "Super-Seal" motors have a 1.15 service factor, which frequently permits using a smaller motor size. Bulletin 05-51B9040 gives an example of how the motor saves 30% on a typical pump drive.

CONVEYOR BELT — Manhattan Rubber Div. of Raybestos-Manhattan, Inc., Passaic, N.J. has issued a new 12-page brochure covering its new Ray-Man conveyor belt. The brochure, Bulletin M302, contains drawings to illustrate the compensation and other features of the belt. Manhattan claims no breaker fabric is needed for their new belt, which means more thickness of the cover is utilized. Other advantages claimed are greater flexibility, more resilience to shock loading, longer life for vulcanized or fastener splices, more rip resistance, and suitable also for 45 degree idlers for greater capacity.

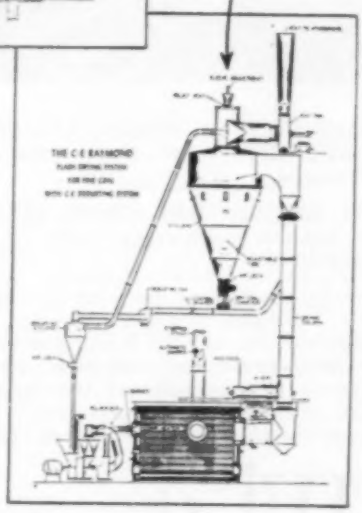
The Problem:

CONTROL OF AIR POLLUTION IN CLEANING FINE COAL

The Solution:



The Wet Scrubber shown above averages 90.7 collection efficiency, with vented air containing no more than 0.1 grain per cu. ft.



Dedusting System at right is proving its effectiveness in many installations, as in average feed of 8.2% thru 325 mesh, the finished dried coal product is only 1.3% of this nuisance material.

C-E RAYMOND FLASH DRYING SYSTEMS

. . . provide a high-efficiency method of drying fine coal in combination with modern type dust control units that comply with non-pollution regulations in restricted areas.

Two different units are available for this purpose: the Roto-Clone Type of Wet Scrubber for washing the vented gases to reduce dust loss . . . and the C-E Dedusting System that extracts the ultra-fine dust from the vent and burns it in the furnace to produce heat for drying.

Either type may be used according to conditions. Since C-E Raymond Equipment is *tailored* to the individual installation, all units are designed to fit the requirements of the plant, and conform to local smoke control ordinances.

• • •

COMPLETE SYSTEMS

C-E Raymond Flash Drying Equipment offers a complete, coordinated system for the rapid drying of fine coal ⅜″ to 0, for large or small plants. Capacity ranges from 10 to 100 tons per hour per column—up to 4 columns per furnace.

It operates as a clean, safe, automatic system without coal degradation. It has high thermal efficiency with low operating and maintenance costs, due to minimum moving parts, and the use of air for both drying and conveying.

Write for Coal Drying Bulletin

COMBUSTION ENGINEERING, INC.

Raymond Division

1315 North Branch St.
Chicago 22, Illinois

Sales Offices in Principal Cities

COMBUSTION ENGINEERING-SUPERHEATER LTD., Montreal, Canada



Why scrap flights?

With Whitney Loader Chain, you can salvage expensive flights for *additional* service . . . save money ordinarily thrown away with worn out chain! Here's why—Whitney's exclusive *detachable* flight design features threaded stud ends with self-sealing lock nuts for quick, easy assembly or disassembly. Tapered studs anchor flights as solidly as one unit for dependable service life.

Further Whitney Mine Chain cost-saving advantages are:

- **SOLID STUD BUSHINGS** — self-cleaning design eliminates stiff joints — provides greater chain pin support by extra rigid design, thus reducing breakage.
- **FORGED STEEL FLIGHT AND UNIVERSAL JOINTS** — 100% Magna-Fluxed and Mar-Tempered.
- **EXCLUSIVE MINE CHAIN ASSEMBLY** for fast, easy maintenance at the face, in the shop or storeroom.

Whitney manufactures the entire product, both chain and flights, to assure completely balanced design, and fast, complete customer service. Whitney distributors, located in all mining areas, carry full stocks of mine chain and American Standard power transmission and conveyor chain. Field engineers always available. Catalogs on request.

Whitney

. CHAIN COMPANY

311AH Hamilton St., Hartford 2, Conn.

ROLLER CHAIN • CONVEYOR CHAIN • SPROCKETS • FLEXIBLE COUPLINGS • WHITNEY-TORMAG DRIVES



The Wise Bird says . . .

"CLARKSON REDBIRD"



for the very finest in Conveyor Chain

Here's why...

Clarkson Redbird has the *welded* flight assembly that ends once and for all any need for adjustment, lessens wear and strain, eliminates stripped and corroded threads, loosened and lost nuts. *Clarkson Redbird* Conveyor Chain is shipped in assembled sections—no need to bolt flights to chain piece-by-piece . . . just join two or three sections to make a complete chain, ready for your hardest service. Ask us for the many supporting reasons for *Clarkson Redbird* leadership in conveyor chain performance—today!

National Mine Service Company

Koppers Building • Pittsburgh 19, Pa.

Distributing Divisions: ALL-STATE DIVISION Logan, W. Va. · ANTHRACITE DIVISION Forty Fort, Pa. · BEMECO DIVISION Beckley, W. Va. · KY.-VA. DIVISION Jenkins, Ky. · MOUNTAINEER DIVISION Morgantown, W. Va. · WHITEMAN DIVISION Indiana, Pa.

Manufacturing Divisions: ASHLAND DIVISION Ashland, Ky. · CLARKSON DIVISION Nashville, Ill. · GREENSBURG DIVISION Greensburg, Pa.

In Canada: NATIONAL MINE SERVICE (CANADA) LIMITED Elliot Lake, Ontario

The SIMPLE LOW COST WAY to RECOVER COARSE COAL FINES



with

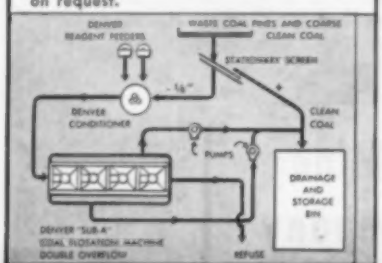
DENVER "Sub-A" COAL FLOTATION

HANDLES 1/8" FEED

With Denver "Sub-A" Flotation machines you can handle 1/8" feed. Ability to float coarse fines eliminates costly intermediate treatment steps, aids fine coal dewatering and water reclamation, simplifies construction of fine coal recovery systems.

Although coal particles as coarse as 1/8" may not always be completely recovered by the flotation process (which is most effective with minus 28 mesh coal), you will recognize the advantage in simplification provided by handling all of the undersize from coal cleaning and recovering all floatable coal in one low in ash product.

Over 95% of all coal flotation plants in the U. S. use Denver "Sub-A". Why not follow their lead? Case histories on request.



DENVER EQUIPMENT CO.

1400 Seventeenth St. Denver 17, Colorado

Among the Manufacturers

Jeffrey Personnel Changes

Byron M. Bird, Manager, Materials Preparation Dept., Jeffrey Mfg. Co., Columbus, Ohio, will retire Dec. 31. He will be replaced by George Kepley.

Mr. Bird began his career with a metallurgy degree from the University of Washington. After a 1 yr stint as a laboratory instructor in the College of Mines there, he joined the U.S. Bureau of Mines in 1920, where he stayed until 1930. He then was associated with Battelle Memorial Institute in Columbus doing research on ore dressing and coal preparation. It was here that he gained a world-wide reputation in the beneficiation of raw materials. He joined Jeffrey in 1944.

Mr. Kepley came to Jeffrey in 1946 following his graduation from Ohio State University as a mechanical engineer. His most recent assignment was district manager of the Bluefield, West Virginia office. He is replaced there by Edwin C. Stephenson, sales engineer in the Pittsburgh district office.



Mr. Kepley



Mr. Bird

Penn Machine Expands

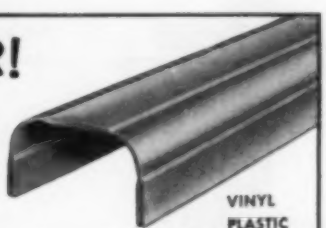
Penn Machine Co., Pittsburgh, makers of mining equipment, has added 11,000 sq ft of floor space to its Johnstown plant, in addition to new machinery and heat treating facilities.

Expressing the "utmost faith in the early return of the U.S. economy to greater prosperity," Penn president Richard Wright said, "our investment, which will cost in excess of $200,000 will enable us to keep pace with the requirements of the mining industries in the coming years."

Wright further explained Penn's business philosophy by saying "we have taken advantage of business conditions of the

BRIGHT Yellow COLOR!

Guyan VISI-GARD



VINYL PLASTIC
Will Not Support Flame

The Trolley Guard with BUILT-IN Safety!

SHAPED RIGHT TO HANG RIGHT. Write for literature.

GUYAN MACHINERY CO. LOGAN, WEST VIRGINIA



TURNOUTS? You bet! Bethlehem can furnish prefabricated turnouts precisely engineered to fit specific locations in your haulage system. Whether you need just a frog, switch points, or a complete new track layout, you can look to Bethlehem for the facilities and the skilled engineering to meet your needs to a T. Why not consult a Bethlehem engineer on your trackwork problems? Call or write Bethlehem Steel Company, Bethlehem, Pa.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation.

BETHLEHEM STEEL

BETHLEHEM STEEL

Get DOUBLE EXPANSION for DEPENDABLE roof support with PATTIN roof bolts and expansion shells



STYLE D-1

The unique double expansion feature of all Pattin expansion shells insures *dependable* roof support, in hard or soft roof conditions. Their double holding power guards against failure — even under a 20 ton pull!

Pattin features include a parallel contact with the hole, and no definite drilling depth is required, as the shell can be securely anchored at any place in the hole. They anchor solidly and will not turn while being tightened. Wedge and shell are assembled in a manner to prevent loss of parts in handling, and the bolt and shell assembly are furnished as a complete unit. Plates are bundled separately. No special nuts or ears are required on the bolts. These features make a safer roof — and a safer roof means fewer accidents, increased production, more clearance for equipment operation and better ventilation.

Pattin specializes in roof bolting —it's our business, not just a sideline! Your business is important to us, and our service engineers are always available for consultation on your roof problems—ready to give you service when you need it! WRITE OR PHONE US TODAY for complete details.

Reg., U.S. and foreign Pat. Offices



The PATTIN split-type BOLT



The split-type bolt is one of the first slotted bolts, and continues to be a favorite wherever split-type bolts are used. Many miners still prefer this type. The bolt is a full 1-inch in diameter, with cut threads and furnished with hex or square nuts and various size plates and wedges.

IN WESTERN STATES

Pattin expansion shells are available and serviced exclusively by Colorado Fuel and Iron Corporation, Denver, Colorado. Western mining companies should contact them direct for information and consultation.

PATTIN

MANUFACTURING COMPANY
MARIETTA, OHIO

The PIONEER of roof bolting . . . established 1888

New ideas come easier—



DEEP MINING • STRIPPING • PREPARATION • MAINTENANCE • SUPPLIES • SAFETY • TRAINING • OPERATION STANDARDS • BUYING DIRECTORY

When you consult your Coal Age Guidebook

If you were one of COAL AGE's 14,475 regular subscribers last July, you received the new 1958 edition of our Annual Mid-July Mining Guidebook and Buying Directory Issue—a completely new edition covering all phases of mine operation—the only complete, single-volume reference guide to present-day mining methods and equipment available anywhere.

For here, always available in one volume, you have a valuable source of new ideas, operating suggestions and equipment data. Easy-to-use reference tables, charts and diagrams will help you evaluate for yourself the latest, most important techniques in every phase of mine operation.

Whether you're working on a specific problem, planning new facilities or seeking a fresh slant, make the COAL AGE Guidebook your starting point.

For time-saving reference on where to get equipment, materials and services you need, consult the Guidebook's Buying Directory listing all known manufacturers of over 1,200 products. The industry's largest and most complete buying guide—fully revised and updated for the 1958 issue—it's supplemented by detailed product data in manufacturers' advertising and listings of their sales offices and distributors nearest you.

Check Your 1958 Edition NOW!

Control Cable Savings Begin with Small Diameters



For New Work or Rewiring...

SPECIFY & BUY
ROCKBESTOS PNR
600 VOLT CONTROL CABLE

PNR — Polyethylene • Nylon • Rockhide (PVC)

HERE'S THE PROOF WHEN IT COMES TO CONDUIT FILL

No. 12 A.W.G. (19/25)		1 CABLE PER CONDUIT				2 CABLES PER CONDUIT				3 CABLES PER CONDUIT				4 CABLES PER CONDUIT			
		Max. Cable Dia."	Number of Conductors in one Cable			Max. Cable Dia."	Number of Conductors in one Cable			Max. Cable Dia."	Number of Conductors in one Cable			Max. Cable Dia."	Number of Conductors in one Cable		
COND. SIZE,		Table 11 N.E.C.	ROCK PNR	3/64"	4/64"	Table 11 N.E.C.	ROCK PNR	3/64"	4/64"	Table 11 N.E.C.	ROCK PNR	3/64"	4/64"	Table 11 N.E.C.	ROCK PNR	3/64"	4/64"
½"	New Work	.450	2-4			.243				.234				.195			
	Rewiring	.479	2-4			.276				.252				.218			
¾"	New Work	.598	5-7	2-3		.323				.311				.260			
	Rewiring	.636	5-8	2-4	2	.367				.335				.280			
1"	New Work	.762	8-14	4-7	2-4	.412	2-3			.396	2						
	Rewiring	.811	8-16	5-8	3-5	.468	2-4			.427	2-3						
1¼"	New Work	1.000	15-19	8-12	5-8	.543	4-5	2-3		.523	3-5	2-3					
	Rewiring	1.070	17-19	9-16	6-9	.618	5-8	2-4		.564	4-5	2-3					
1½"	New Work	1.170		13-19	9-12	.634	6-8	4	2	.610	6-7	4					
	Rewiring	1.248			10-14	.721	9-11	5-7	2-4	.658	6-8	4-5	2				

This is an excerpt from the Rockbestos Control Cable Conduit Fill Chart covering sizes A. W. G. 9, 12, 14. Write today for your free copy. Ask for PNR 1-58.

ROCKBESTOS PRODUCTS CORPORATION, NEW HAVEN 4, CONNECTICUT

NEW YORK • CLEVELAND • CHICAGO • OAKLAND • LOS ANGELES • PITTSBURGH • ST. LOUIS • DETROIT • SEATTLE • ATLANTA • DALLAS

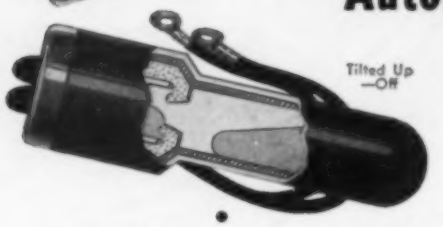
ROCKBESTOS



PNR
Small Diameter Control Cable

MORE THAN 16,000,000 FEET IN SERVICE





DURAKOOL Tilt Switches are the Life of your Automatic Controls

MILLIONS OF CYCLES WITHOUT FALTERING

This steel-clad Durakool mercury tilt switch has unique construction features that deliver years of trouble-free performance on the most difficult assignments you can find. Operating under sealed-in, pressurized hydrogen gas, it takes 24 hours, fast cycling schedules in stride. 7 sizes, 1 to 65 amperes. Send for Bulletin D-49

See telephone directory for local distributor, or write.

DURAKOOL, INC.

ELKHART, INDIANA, U.S.A.

700 WESTON RD., TORONTO 9, CANADA

Durakool ALL-STEEL MERCURY *Switches*

DESIGN . . .

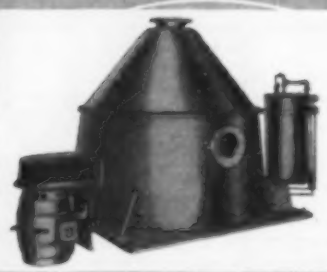
ENGINEERING . . .

ABILITY TO RENDER SERVICE

CMI

MAKE THE DIFFERENCE

Factors such as these account for the remarkable performance of the CMI Continuous Centrifugal Dryer. Water content is reduced from 35% to less than 5% at a rate in excess of 75 tons per hour. Service, if needed, is available from any one of three strategic locations.



CMI Continuous Centrifugal Dryer to stop coal from freezing — to recover coal from slurry ponds — at the lowest "per ton" cost!

Write for the new, illustrated Brochure No. EB-36

CMI CENTRIFUGAL AND MECHANICAL INDUSTRIES INCORPORATED

146 President Street • St. Louis 18, Missouri

Manufacturers (*Continued*)

past year to get our house in order for the increased demands which will soon be upon us."

Wilbur E. Combs is the manager of development for the mechanical goods division of United States Rubber Co., Passaic, N.J., according to L. J. Healey, vice-president and division general manager.

Mr. Combs joined the company in 1945 at the Kansas City Branch. As he worked his way up, he has held positions as salesman, sales engineer, sales manager, sales promotion manager, and market research manager.



Dr. William P. Yant has been awarded the Arthur Williams Medal, one of industry's outstanding safety awards.

Dr. Yant, director of research and development for Mine Safety Appliances Co., received the honor at the annual award dinner of the American Museum of Safety in New York City.

His 38 patented safety inventions include gas masks, air purifying cannisters, and respirators. He also has contributed numerous safety methods to industry.

He has been a member of the board of directors of the National Safety Council since 1947, and was the first president of the American Industrial Hygiene Association.

John O. Campbell was appointed Chicago area sales manager for Westinghouse Electric Corp.'s apparatus division in Pittsburgh, Sept. 1.

He formerly was distribution apparatus manager of the central region with headquarters in Pittsburgh. He joined the company in 1946, and was named to his most recent position in 1954.

The Mine & Smelter Supply Co., Denver, has joined forces with its subsidiary, Colorado Iron Works.

All products manufactured by both



Twin-screw diesel towboat *Humphrey*, 132' x 27' x 9'6".

New Dravo towboat for Consolidation Coal

Lower costs per ton mile, a major aim of Dravo's extensive marine research program, have been designed into the new 1,600-horsepower towboat *Humphrey*.

Now operating on the Monongahela, Allegheny, and upper Ohio Rivers, the *Humphrey* is the most advanced and efficient towboat of her draft on the inland waterways.

Here are some of the things that make her so:

New hull design with longer, leaner stern lines and broader stern tunnels produces more push with less power. Steering and flanking rudders have been reshaped and relocated for better flow characteristics. Kort nozzle shape has been refined for greater thrust. Struts are located aft rather than forward of the seven-foot, stainless steel propellers which have been modified for more efficient use of engine power.

All exposed surfaces of the Kort nozzles, rudders and aft end of the hull are protected from corrosion by stainless steel.

The *Humphrey* is the fourth towboat in Consolidation Coal's fleet—all have been built by Dravo.

For more information, contact DRAVO CORPORATION, PITTSBURGH 25, PENNSYLVANIA.

DRAVO
CORPORATION

NEW easy way to recover roof bolts with

SIMPLEX

TRIP POST
JACK No. M279

- 24″ Rack Bar Travel
- High Strength Aluminum Alloy Column and Castings
- Light weight — 72″ min. height, weighs only 36 lbs.
- Sizes for all seam heights available



SAFE, EASY-TO-USE...

Two men can recover 350 bolts per day by using it as follows . . .

Place a Jack alongside each of the first row of bolts closest to the face. Raise to the roof to provide temporary support. Remove bolts by hand or pneumatic wrench. Stand 25′ or more away and pull on a rope attached to the Jack trip lever which collapses the Jack. Move Jack to position under the next row of bolts and proceed as previously.

SEE YOUR DISTRIBUTOR, or write
TEMPLETON, KENLY & CO.
2501 Gardner Road, Broadview, Illinois

WORLD'S LARGEST MFGRS. OF INDUSTRIAL
MECHANICAL AND HYDRAULIC JACKS
SIMPLEX
RE-MO-TROL UTIL-A-TOOL **JACKS** JENNY ROL-TOE

PRODUCER

The Wemco-Fagergren Flotation Machine:

Proved — World Standard in Profitable Production

The answer is not in creating bubbles — but in creating bubbles that work efficiently to produce clean, low ash coal.

Wemco Fagergren, more than ever, is a standard in the world's major operations. It consistently gives highest recovery of clean coal per dollar spent. It maintains a world-wide reputation for dependable production — under the toughest conditions.

The investment in Wemco Fagergren is sound — wherever maximum production at lowest costs is a vital factor of operation.



Depend on Wemco Fagergren Flotation and the skills behind it.

WEMCO®

Western Machinery Co. 650 Fifth St. • San Francisco, Calif.
and throughout the world



When choosing your shovel feeder cable...

How much of a choice do you really have?



HIGH RESISTANCE TO MOISTURE is just one of the benefits you get with Rome's portable shovel cable. This tough cable—available with *both* oil-base and butyl-base insulations—provides long-life service under the most severe conditions.

Shovel cable may *look* alike . . . but you can find as many differences in cable as you can in mining operations. And your particular kind of operation deserves the one best cable.

That's why it's so important to choose your Type SH-D cable from a manufacturer who can offer you an unbiased recommendation as to the proper insulation for your own application.

Your choice of insulations. Rome Cable is one of only three major companies now making *both* butyl-base and oil-base insulations. This means you can describe your mining conditions to a Rome representative and get the one *right* insulation for your feeder cable. No matter what you want most in your cable—maximum resistance to heat, moisture, or ozone resistance—you can be sure of your choice when the cable is made by Rome Cable.

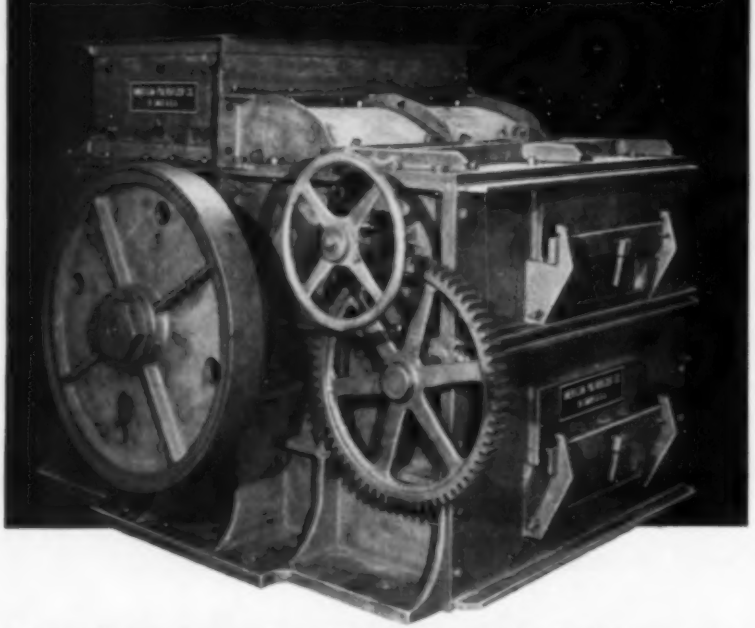
Tough jacket, too. Feeder cable takes a beating in most open pit mines, so you naturally want to choose a cable that's tough. Rome's mold-cured Rome 60 (neoprene) jacket provides maximum resistance to abrasion and crushing . . . and it's ideal for use in either wet or dry locations.

Choose carefully. No matter what type of shovel cable you need, take advantage of Rome's ability to offer you a *real* choice of insulations. When you present your shovel cable problems to your nearest Rome Cable representative, you can be sure he'll recommend the *right* cable—not just the best his company can provide. Contact him for more information—or write to Department 530, Rome Cable Corporation, Rome, New York.

ROME CABLE

CORPORATION

American Coal Crushers are RUGGED!



Soundly engineered and constructed to give you many years of high volume crushing at low operating costs.

1. Oversize bearings.
2. Alloy Steel heat treated rotor shaft.
3. Heavy rib reinforced housing with renewable liners and tramp metal pocket.
4. Manganese Steel crushing elements.
5. Exclusive American-Originated rolling shedder ring which splits coal instead of crushing it.
6. More efficient crushing design which permits slower operating speeds and less power consumption per ton of coal crushed.
7. Dual adjustment to give flexibility of size control and to compensate for wear.
8. Maximum flexibility of rolling ring rotor prevents injury from tramp iron.
9. Full width screening area gives faster discharge of reduced product.

Coal Crushers exclusively, from Sample Crushers to Capacities of 800 TPH
Write for literature stating capacity you need.

American PULVERIZER COMPANY
ORIGINATORS AND MANUFACTURERS OF RING CRUSHERS AND PULVERIZERS
1119 MACKLIND SAINT LOUIS 10, MISSOURI

Manufacturers *(Continued)*

companies will be designed, made, and sold by the parent company. Donald J. Drinkwater, former assistant manager of the company's Marcy Mill Div., is manager of the new manufacturing division.

Four new appointments to sales positions have been announced by the Drill Division, Bucyrus-Erie Co., Richmond, Ind.

The appointees and their positions are: William G. Barnes, blast hole drills, sales engineer; Robert E. Cannon, service manager; Mark J. Janich, parts and tools sales supervisor; and William G. Piper, sales technical section supervisor.

W. O. Bechman and Merrill R. Bennett have been appointed assistant to the general manager and manager of the engineering division, respectively, in the construction equipment division of International Harvester Co., Chicago.

Bechman began his company service in 1917. In his new job, he will study the need of the industry and make recommendations for improvement and new design to division management. Bennett, who succeeds Bechman as engineering manager, began his career with International Harvester in 1934.

Newcomer Products Corp., Latrobe, Pa., manufacturers of mining drills and bits, has appointed the Marshall Equipment Co., Huntington, W. Va., as sales representative.

Marshall will serve the four-state area of southern West Virginia, eastern Kentucky, northern Tennessee, and Virginia. In addition, the Marshall warehouse at Huntington will maintain a complete line of Newcomer stock.

H. K. Cogswell has been appointed Eastern Regional Sales manager for the Western Machinery Co., San Francisco.

Headquartered in New York City, Cogswell will oversee all Western Machinery sales operations in the eastern states. He joined the company in 1947. Prior to his new position, he was a sales engineer in Phoenix.

Glenn M. Hansen has been appointed process development engineer in the processing machinery department of Allis-Chalmers Mfg. Co., Milwaukee.

Hansen was associated with process development work for many years before joining A-C in 1955. In his new post, he succeeds W. F. Stowasser, who resigned.

National Mine Service Co. has established a new Canadian subsidiary, National Mine Service Ltd., Elliot Lake, Ontario.

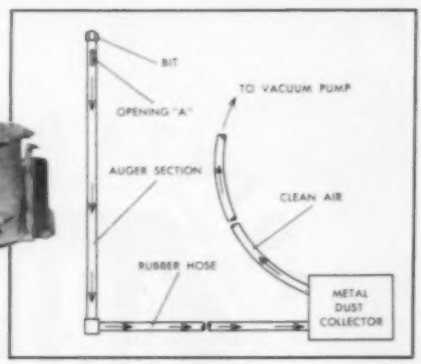
The new company will provide distribution and service of mine equipment and supplies.

NEW Hydraulic Roof Bolting Machine *with revolutionary* "Thru-the-Auger" Dust Collection

SCHROEDER ROOFCAT

(U. S. Bureau of Mines Approved)





This sketch shows the new and unusual "Thru-the-Auger" dust collecting system. As the bit penetrates the roof the dust is sucked into openings (A) —then through the hollow auger into the heavy rubber tubing and on to the large metal dust collector mounted on rear of machine.

EFFICIENT BOLTING

QUICK DRILLING! QUICK BOLTING! Flexible, the "Roofcat" fills the need for a hydraulic machine which drills efficiently and quickly in a matter of seconds and with very little effort by the operator. Thoroughly tested, under actual mining conditions, the "Roofcat" performed well and economically.

SURE TRAMMING

COMPACT AND LOW-SLUNG, it is extremely flexible and is maneuvered positively by simple dual controls which permit crawlers to be operated in unison or independently. Adjustable to conditions, the tramming speed can be varied from an inching crawl up to 175 feet per minute.

DUST COLLECTORS

THE "ROOFCAT" CAN BE HAD with any one of three dust collecting systems. 1—Gravity type. 2—Vacuum type. Or 3—the new and unique "thru-the-auger" type which is shown in the artist's sketch above.

The machine's hydraulic system is protected by a micronic return line filter built right into the tank.

GENERAL SPECIFICATIONS

Height 23"; Width (without riding platform) 36"; Length 102"; Feed length 22" to 38"; Roof heights 32" to 48". Optional: Hydraulic stabilizing jacks; riding platform.

Before buying just any roof bolting machine, consult a Schroeder man about the "ROOFCAT."

SCHROEDER BROTHERS CORPORATION

NICHOL AVENUE, BOX 72 McKEES ROCKS (Pittsburgh District), PA.

Hydraulic, Electric and Pneumatic Equipment

The A.B.C. Symbol . . .

The right to purchase or refrain from purchasing this publication gives you, the reader, and no one else the power to pass judgment on whether it shall continue to survive.

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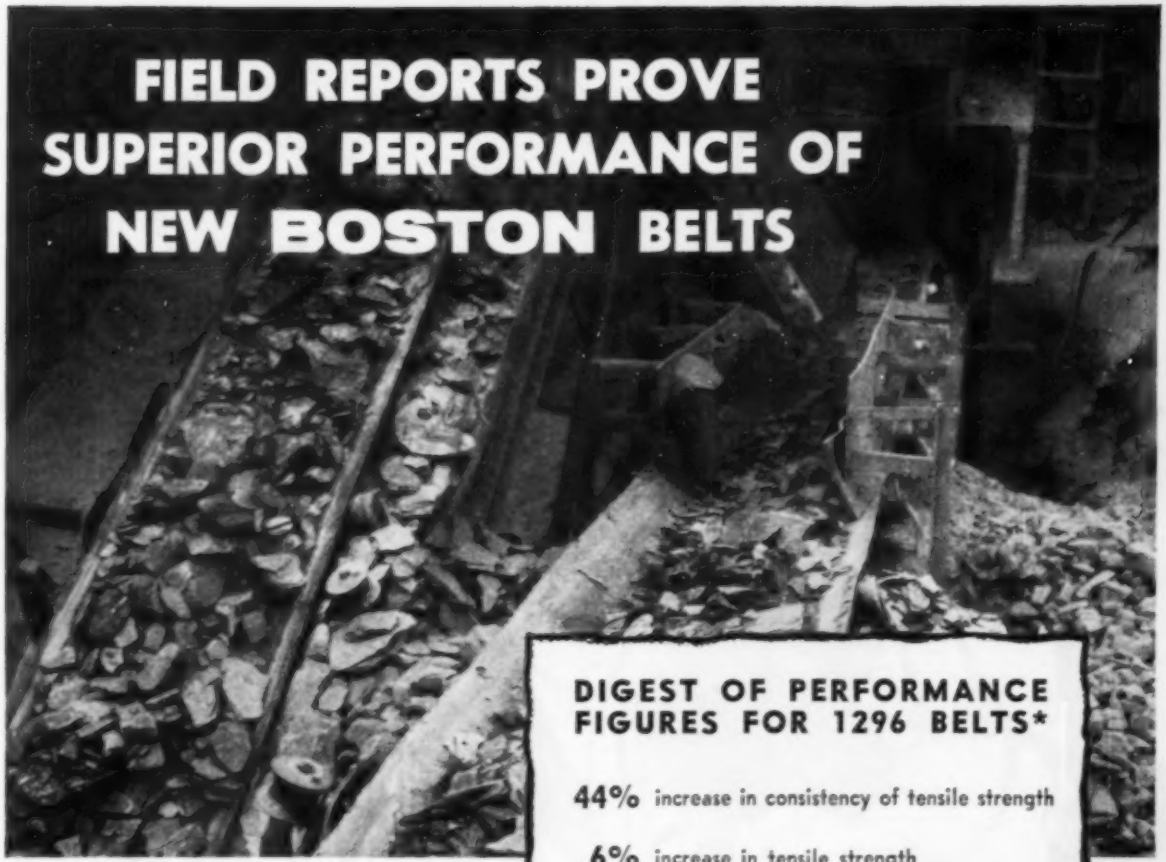
COAL AGE

SINCE 1911 . . . LEADING INFORMATION SOURCE FOR PROGRESSIVE MINE MANAGEMENT

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HALLMARK OF CIRCULATION VALUE

FIELD REPORTS PROVE SUPERIOR PERFORMANCE OF NEW BOSTON BELTS



DIGEST OF PERFORMANCE FIGURES FOR 1296 BELTS*

44% increase in consistency of tensile strength

6% increase in tensile strength

130% improvement in consistency of elongation

*Compared to belts previously manufactured

HERE'S WHAT DOES IT!

The startling figures above are a direct result of two major belt manufacturing advancements — both developed by, and exclusive with, Boston Woven Hose & Rubber Co.

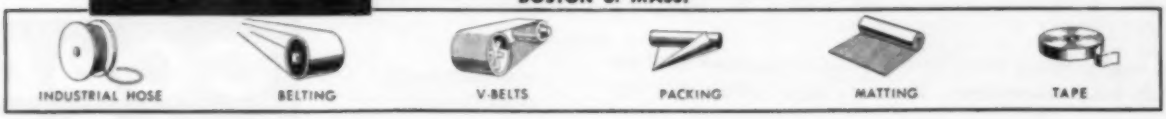
ADVANCEMENT #1 **BALANCED BELT CONSTRUCTION** for the first time equalizes ply stress so that each ply pulls its full share of the load. **BBC** eliminates lazy plies. A BOSTON exclusive because only BOSTON can combine Electronic Tension Controls with Rotocure, the continuous method of vulcanization, which assures uniformity throughout the belt.

ADVANCEMENT #2 **DULON** markedly improves the aging characteristics of BOSTON belts. An exclusive BOSTON research development, the tough specially treated cover compound stays resilient longer . . . makes the belt much more resistant to abrasion, gouging, tearing and oxidation.

BALANCED BELT CONSTRUCTION plus **DULON** add up to longer belt life . . . less trouble in service . . . greater economy.

BOSTON

BOSTON WOVEN HOSE & RUBBER COMPANY
DIV. OF AMERICAN BILTRITE RUBBER CO., INC.
BOSTON 3, MASS.





WHERE THERE'S BUSINESS ACTION THERE'S A BUSINESSPAPER

Used to be a song, back in the Thirties, titled, *Little Man, You've Had a Busy Day.* Didn't mention the Big Man. But his days are busy, too. He's the man who must make top-level decisions in business. And to make those decisions, he must have facts. All the facts. All the pertinent information he can get.

He finds time, in his busy days, to get that information. How? By getting a major portion of it from one unique source: the business publications serving his particular field.

No businessman, Little or Big, is fully informed until he reads his businesspaper. He reads it for profit, not for pleasure. He searches it through for news of the trade or industry. For facts. For fresh ideas. For new products he can put to work. And he reads the advertising with the same intense concentration he devotes to the editorial pages.

For the man on his way toward becoming a Big Man, his businesspaper is especially important. Take a tip from the reading habits of key men at every level. Take out a subscription of your own. Then, make the time to read every issue—and read it thoroughly.

WHERE THERE'S
COAL MINING
BUSINESS THERE'S . . .

COAL AGE

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Drill Contractors Since 1902
Specialists in exploratory—grout, hole and pressure groutings. Rigs located in over 30 strategic areas for prompt service. Free estimates.
104 Cedar St. — Punxsutawney, Penna.

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Coal Mine General Superintendent or Superintendent, 20 years experience in all phases of coal mining. Proof of ability in low cost production. Reference on request. PW-8966, Coal Age.

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Lease or purchase—large or small tracts. Morgan Coal Company, 2870 North Meridian Street, Indianapolis 8, Indiana.

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915 acres steam coal rights located in Clay County, W. Va. for sale to settle an estate. Estimated recoverable tonnage of coal 10,043,040 tons. Ample supply timber on purchasable property. Four rail road miles from main B&ORR with state highway through property. Analysis and other pertinent information available from C. A. Newcomb, Jr., 236 S. Spalding Drive, Beverly Hills, Calif.

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Chicago Pneumatic RBD-30 Roof Bolting Drill, 32 E Joy Shuttle Cars, 100 KW Diesel with 250 volts D.C. Generator.
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963'—48" Belt Conveyor, Complete
1,500'—44B Jeffrey, 36" Belt Conveyor Structure
300'—36" Joy Limberoller Belt Conveyor complete unit, Like New
1,000'—36" Joy Belt Conveyor, Complete
8—36" Joy Belt Drives, Complete
1,500'—36" Barber Greene Belt Conveyor
1—36" x 150' Belt Conveyor
4—1,000" centers, 62HC Goodman Belt Line, complete w/Drives, Belt, Etc.
3—MTB 30" Joy Belt Conveyors, 1,000' centers complete w/Tandem Drives, Structure, Etc.
1—MTB Ladel Tandem, 30" Belt Conveyor Drive 25 h.p., 250 V. D.C., complete with controls
4—99-50T, 30" Goodman Belt Conveyors, complete with 250 V. D.C., 40 h.p. Drives, Structure and Belting, Excellent Condition
1—Goodman Tandem 40 h.p. Drive, 30" w/1,000' Goodman Rope Structure, complete with Belting and all appurtenances
2—40 h.p., 250 V. D.C. Goodman Tandem Belt Conveyor Drives for 30" Conveyors, Excellent
3,848'—30" Jeffrey 32B Structure
500'—30" Barber Greene Structure
2—30" Belt Conveyor Drives, shop constructed w/15 h.p. Motor and Controls
900'—26" Joy Belt Conveyor
1,000'—26" Jeffrey 32B Belt Conveyor
16—26" Belt Drives of various types
500'—24" Goodman Belt Conveyor, Complete
10—20" Joy Chain Conveyors, Permissible
12—15" Long Chain Conveyor, 300' centers complete w/400 DBH Long mobile head drive, 25 h.p. Motor, 250 V. D.C., Cat Mounted
2—15" Joy Chain Conveyors, Permissible
26—12" & 12" 81EW, 81HC, 61W & 61AM Jeffrey Chain Conveyors
8—G12½ Goodman Shakers, complete w/10", 21 pans
32—G12½, G15 & G20 Goodman Shakers
3—PT12 Long Piggyback Conveyors
20—Goodman Power Duckbills, Model 477
2—PT15 Long Piggyback Conveyors, Late Type
10—PT15-B Long Piggybacks with 5 h.p., 250 V. Motors

TRACKLESS EQUIPMENT

5—Long 66 Pig Loaders
2—20BU-3E Joy Loaders, 250 V. D.C.
1—14BU-7RBE Joy Loader
1—14BU-7RAE Joy Loader, 250 V. D.C.
2—14BU-3PE Joy Loaders, 250 V. D.C.
9—14BU-2E Joy Loaders, 250 V. D.C. 28" O.H.
1—12BU-9E Joy Loader
1—8BU Joy Loader, Rebuilt
2—Myers Whaley, 23 Loaders
4—8SC Shuttle Cars, Elevating Discharge
7—8SC, 5E & 5EX Joy Shuttle Cars, matched pairs, disc brakes, elevating discharge
2—4SC Joy Shuttle Cars
2—5SC Joy Shuttle Cars, Matched Pair
1—8SC Joy Shuttle Car, Elevating Discharge
4—32D Joy Shuttle Cars
4—32E7 Joy Shuttle Cars
4—32E10 Joy Shuttle Cars, Rebuilt
1—32E16 Joy Shuttle Car
6—42E13 Joy Shuttle Cars, Matching Pairs
10—T2-2E and 5E Joy Cat Trucks
2—Joy Elevators, PL11-7PE and 8PE
2—Acme Self Propelled, 40 h.p. Air Compressors, Permissible
1—50 h.p. Acme, 210 CFM Compressor
1—WK29 Sullivan Air Compressor
2—240 cu. ft. WK-83 Joy Compressors, rubber mounted, self-propelled, 30" O.H., Excellent
1—210 cu. ft. Acme Compressor, on rubber
2—125 cu. ft. WL-82 Sullivan Compressors, rubber mounted and self-propelled
3—Joy T12 Supply Jeeps, Battery complete w/Batteries & Chargers
2—WBA Bantam Rock Dusters on tires
1—360 Goodman Loader, Rubber Mounted
1—CD25 Joy Coal Drill, Perfect
1—T1 Joy Cat Truck
5—Joy T2-5 Cat Trucks
4—RBD 30 CP Roof Bolting Drills
11—Manson Jeeps with 9J Motors

TIPPLE EQUIPMENT

2—Complete Tipples, including Conveyors, Crushers, Bins, Etc.
1—4 Cell Jeffrey Baum Jig Washer
1—CMI Coal Dryer, 48", Excellent
1—Heat Dryer—Complete
1—Marion Double Roll Primary Crusher
1—24" x 30" Pr. Single Roll Crusher
1—30" x 36" Jeffrey Single Roll Crusher
1—34" x 29" Jeffrey Flextooth Crusher
2—24" x 24" Jeffrey Single Roll Crusher
1—18" x 12" Jeffrey Pulverizer
1—5' x 14' Double Deck Vibrator
2—4' x 12' Double Deck Vibrators
1—3' x 8' Low Head Vibrator
5—Jeffrey Traylor Vibrator Feeders
4—Jeffrey Traylor Vibrator Screens
1—Magnetic Separator, Complete
1—Set Jeffrey Dewatering Screens
8—Scraper Conveyors, of various sizes
15—Tipple Belts from 12" to 42" width
1 30" x 42" Loading Boom
Air Valves, Blowers, Pumps, New Screens, Parts for CMI Dryers, Speed Reducers, Feeders & many other parts for Tipple.

RAIL AND WIRE

3,000—Tons 40, 50, 60, 70 & 80 lb. Relaying Rail
50,000'—1,000,000 CM Feeder Cable
826'—900,000 CM Copper Feeder Cable
15,500'—750,000 CM Insulated Copper Feeder Wire
8,500'—500,000 CM Insulated Copper Feeder Wire
30,000'—4/0 Stranded Highline Wire
60,000'—4/0 Rubber Covered & Insulated Copper
50,000'—6/0 Trolley Wire
60,000'—4/0 Trolley Wire
69,000'—2/0 Solid Copper Trans. Line
18,500'—#4 Transmission Wire
285,500'—#2 Solid Copper Transmission Line
38—Spools New Telephone Wire

SUB STATIONS & TRANSFORMERS

1—500KW G.E., M.G. Set
2—300KW M.G. Sets, Allis Chalmers
5—300KW M.G. Sets, G.E.
4—200KW M.G. Sets
2—200KW, G.E. HCC6, 2300/4000 Volt Rotary Converters
13—150KW M.G. Sets of various makes and primary voltage
1—150KW Rotary Converter-Completely Automatic
2—100KW Motor Generator Sets
1—100KVA Gasoline Generator Unit
2—50KW M.G. Sets, 125 V. D.C., 1200 RPM
2—MG. Sets, 25 h.p., 220/440 V. A.C.
2—Armatures for 150 & 200KW Rotary
2—600 & 800KW Auto Transformers
150—Transformers from 5 KVA to 500 KVA

MINE CARS

30—50" t.g. Drop Bottom Cars
200—42" t.g. End Dump Cars, Various makes
22—42" t.g., ACF, 6 Ton Drop Bottom Cars
33—44" t.g. Drop Bottom Cars, 10 Ton
100—44" t.g. Drop Bottom Cars, various sizes
180—44" End Dump Cars, various makes
330—48" t.g. S.D. Drop Bottom Cars, 22" O.H.
134—48" t.g. ACF Drop Bottom Mine Cars, 34" O.H.

LOCOMOTIVES

2—20 Ton MH77 Jeffrey, 42" t.g.
1—15 Ton Westinghouse Locomotive, unit no. 1443, 28" O.H., 90 h.p. units, pneumatic brakes, trolley pole and controls, 48" t.g.
1—15 Ton HM820 G.E. Locomotive, 90 h.p. units, 44" O.H., 48" t.g., Excellent
14—13 Ton Locomotives, 250 Volt, any gauge
3—12 Ton 20B Goodman Locomotives, 48" O.H.
5—10 Ton Locomotives, 250 Volt, any gauge
14—8 Ton Locomotives, 250 Volt, any gauge
9—7 Ton Atlas Battery Locomotives
1—6 Ton Battery Locomotive—New
51—6 Ton Locomotives, any gauge
2—6 Ton Jeffreys, MH150 Locomotives
3—6 Ton MH88 Jeffrey Locomotives
1—5 Ton Locomotive, 250 Volt
15—4 Ton Locomotives, 250 V., any gauge
1—4 Ton 82BA G.E. Battery Locomotive
1—4 Ton Mancha Battery Locomotive
1—3 Ton Locomotive, 250 Volt

CUTTING MACHINES

3—7AU Sullivans
10—11B Sullivans, 35 & 50 h.p.
16—12AB & 12AA Standard Goodmans
2—112AA Universal Goodmans
4—212AA Baby Goodmans, 250 Volt
1—212G3 Baby Goodman, 220/440 V.
10—312 and 712 Goodmans, w. Bugdusters
1—624 Goodman, 42" t.g.
1—29U Jeffrey, 250 Volt
1—29U Jeffrey, 220/440 Volt, A.C.
40—35B & 35BB Jeffreys, A.C. & D.C. Bugdusters & Trucks available

MISCELLANEOUS

6—HKL Brown Fayro Car Spotters
2—CW Sullivan 5 h.p. Car Spotters
1—HKI Brownie Layer Loader Hoist
96—Hoists, from 5 h.p. to 800 h.p.
564—Stationary Motors: ½ to 800 h.p. of various specifications
110—Pumps from ¾" to 4500 GPM of various specifications
1—400 h.p. Deming Deep Well Pump
1—338 GPM 6" Pomona Deep Well Pump
1—4" Centrifugal Slurry Pump w/15 h.p. Motor
1,600'—2" Plastic Pipe
7,000'—2" Black Pipe
300'—4" Black Pipe
31—Mine Fans from 30" to 6' Hi Pressure
108—Coal Drills 571CP, 572CP, 573CP, 473CP, A5 and A7 Jeffrey
3—Sullivan Jumbo Drills, track mounted
1—WK29 Sullivan Air Compressor, 120 cu. ft. capacity, 48" t.g.
1—WK30 Compressor, track mounted, self-propelled, 120 cu. ft. capacity, 48" t.g.
2—Cantrell Compressors, 120 cu. ft. capacity, 48" t.g.
1—Canton Track Cleaner, presently 48" t.g.
6—Cleveland Scissors
13—Scales for Mine Trucks and Trucks
22—Air Compressors of various sizes
6—Dozers: D4, D6, D7 HD7 & TD14A
11—Rock Dusters up to 30 h.p. track and rubber mounted
1400—Edison Lamps, Model P & R4
57—Auto Starters from 3 h.p. to 100 h.p.
1—Dust Collector for underground use

SHOP MACHINERY: Lathes, Drills, Grinders, Welders, Shapers, Planers, Presses, Milling Machines, Band Saws, Hand Press, Etc.
We have thousands of dollars worth of parts for the equipment listed herein.

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2—Jeffrey 35L Mining Machines, Permissible, 230V. D. C., 7½' cutter bars.
1—Goodman 612 Mining Machine Permissible, 230V. D. C., 6½' Cutter bar.
3—1200 Amp. ITE Circuit Breakers 275V. D. C. Automatic
1—3000 Amp. ITE Automatic Circuit Breakers 255 V. DC.
1—1600 Amp., ITE Automatic Circuit Breaker 275 V. DC.
2—300 KW. GE Motor Generator Sets, 1200 RPM, 275 V. DC. 2300 3/60.
2—250 KW-GE Motor Generator Sets, 1200 RPM, 275 V. DC. 230/3/60 Automatic Control.
3—500 KW and 750 KW West Rotary Converters, 1200 RPM, 600V. DC. 11000 Volt transformers, Automatic control.

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J. T. FISH stands ready to buy any quantity of mining equipment of any kind, whether one item or complete mine. Therefore, if you have need for any mining equipment, rails, copper wire or supplies you can always be sure of an "adequate" and "immediate" supply from J. T. FISH at any time. "WE PAY FAIR PRICES ALWAYS" "WE SELL AT FAIR PRICES ALWAYS." IT WORKS BOTH WAYS.

WE BUY SELL TRADE

JOY EQUIPMENT—REBUILT

3—Joy 14-BU Loaders, low pedestal, 7AE.
2—Joy 14-BU Loaders, medium pedestal, 7BBE.
1—Joy 14-BU Loader, high pedestal, 7BE.
2—Joy 12-BU Loaders, 9E, latest type.
1—Joy 12-BU Loader, 220 volt AC.
1—Joy 20-BU Loader, latest type.
1—Joy 11-BU Loader, latest type.
2—Joy 8-BU Loaders, 230 volt DC.
1—Joy 8-BU Loader, 34" overall height.
2—Joy 8-BU Loaders, 220 volt AC.
1—Joy curved Bar Head, complete.
6—Reliance 24-J Motors, 7½ H.P.
4—Reliance 10-J Motors, 5 H.P.
20—9-J Motors, 4 H. P.
6—New Wheel Units for Joy 6SC Shuttle Cars.
1—Goodman 660 Loader on cats, excellent.
1—Goodman 665 Loader on cats, latest type.
1—Goodman 865 Loader 26" hi.
2—Joy 8SC Shuttle Cars, rebuilt.
2—Joy 6SC Shuttle Cars, rebuilt.
2—Joy 5SC Shuttle Cars, rebuilt.
2—Joy 32E9 Shuttle Cars.
2—Joy 32E10 Shuttle Cars, rebuilt.
2—Joy 32E15 Shuttle Cars, rebuilt.
1—Joy 32E16 Shuttle Cars, rebuilt.
2—Joy 42E16 Shuttle Cars, rebuilt.
3—Joy CD-22 Drills, like new.
4—Joy T-2-S low pan Cat Truck.
1—Joy T-2-6 low pan Cat Truck with reel.
2—Joy T-1 Standard Cat Trucks, 220 AC.
1—Joy T-1 Standard Cat Truck, 250 DC.
2—Joy 11-B Cutting Machines, like new.
1—Joy 7-B Cutting Machine, like new, 250 volt DC.
2—Joy 7-B Cutting Machines, 220/440 volt AC.
1—Goodman Machine on Cats, 31" high. All hydraulic.
6—Goodman 512 Machines with Bugdusters.
1—Goodman 512 Cutting Machine, perfect.
4—Goodman 512 Cutting Machines, 220/440 volt AC.
3—Goodman 112 Cutting Machines, 220/440 volt AC.
1—Lee Norse low vein Machine Carrier on rubber.
1—Jeffrey 70 URB's, rubber-tired Cutters, Universal head, perfect condition.
1—Joy 10RU Rubber Tired Cutter, first class.
1—Joy 11BU, rubber tired Cutter with bugdusters, Universal head, like new.
2—Jeffrey 29UC Cutting Machines, Universal head, cuts anywhere in seam, 38" high, on cats, 250 volt DC.

LOCOMOTIVES

3—Jeffrey 13 ton, type MH-110, 36", 42" and 44" Ga.
2—Jeffrey 10 ton, type MH-110, 42" and 44" Ga.
1—Jeffrey MH-124, 6 ton, 24" overall height.
12—Jeffrey, 6 ton, type MH-88, 42", 44" and 48" Ga.
2—Jeffrey, 8 ton, type MH-100, 2" armor plate frames.
1—Jeffrey, 6 ton, type 2186, 22" above rail.
3—Jeffrey, 4 ton, type MH-96, 42", 44" and 48" Ga.
1—G.E., 4 ton, type 825 Locomotive, 22" high.
10—G.E., 6 ton, types 801, 803, 821 Locomotives, 42", 44" and 48" Ga.
1—G.E., 8 ton, type 822 Locomotive, 44" Ga.
3—G.E., 10 ton, type 809 Locomotive, 42", 44" and 48" Ga.
1—Goodman, 17 ton, type 165, 30" hi-air brakes, 42" to 48" Ga. like new.
2—Goodman, type 33, 6 ton, 44" and 48" Ga.
3—Goodman, 8 ton, type 32A, 36", 44" and 48" Ga.
3—Westinghouse, type 902, 4 ton, 42" and 48" Ga.
2—Westinghouse, type 904, 6 ton, 44" and 48" Ga.
2—Westinghouse, type 906, 44" and 48" Ga.
2—Westinghouse, type 907, 10 ton, 44" and 48" Ga.
8—Jeffrey MH-78 Locomotive Units, cheap.
3—Plymouth Diesel Locomotives, 8 and 10 tons, 42" and 44" Ga.

LOCOMOTIVES (Cont.)

4—Jeffrey MH-88 Locomotive Units, real bargains.
6—Jeffrey MH-100 Locomotive Units, reasonable.
Locomotive Trucks and Spare Armatures for all the above.

TIPPLE EQUIPMENT

1—Cedar Rapids portable super Screening Plant.
1—Complete 5 track tipple with washer.
1—Allis Chalmers 5'x14' Ripple Vibrator.
1—5'x14' Robins double deck Vibrator.
1—4'x10' Robins Gyrex Vibrator.
1—Roberts & Schaefer tandem Hydro-Separator.
Belt Loading Booms.
1—Robins Car Shakeout.
10—Crushers, various sizes.
Feeders, Drag Conveyors and Loading Booms.

CUTTING MACHINES

1—Joy 11RU, rubber tired, Cutter.
1—Joy 10RU, rubber tired, Cutter.
1—Jeffrey 70 URB Cutters, rubber-tired, Universal Head, low vein.
2—Jeffrey 29UC Universal Machines on Cats.
1—Goodman on cats, 31" overall height.
3—Baby Goodman 212's, rebuilt, 250 volt DC.
1—Baby Goodman 212, rebuilt, 220 volt, 3 phase AC.
1—Goodman 312, 18" high.
6—Goodman 512's with Bugdusters, like new.
4—Goodman, 512's, rebuilt, or as removed from service.
4—Goodman 512's, 220/440 volt AC.
3—Goodman 112's, 220/440 volt AC.
1—Jeffrey 35-L Cutting Machine, 220/440 volt AC.
2—Joy 7-B Cutting Machines, 220/440 volt AC.
2—Joy 11B Cutting Machines, rebuilt.
6—Goodman 12AA's and 112AA's, 250 volt DC.
2—Goodman 224 Slabbers.
2—Goodman 724 Slabbers.
6—Jeffrey 35L's, like new, 17" high.
2—Jeffrey 35L's, on low vein trucks.
1—Jeffrey 35L, 220 volt AC.
15—Jeffrey 35B's and 35BB's.
2—Jeffrey 29B's on track.
2—Jeffrey 29C's track mounted.
2—Jeffrey 29L on track, perfect.
2—Sullivan CR-10's, 15" high.

LOADING MACHINES

16—Joy Loaders, all types.
1—Goodman 460, rebuilt.
2—Jeffrey 61 CLR's on rubber, 26".
3—Jeffrey L-500 Loaders.
2—Myers Whaley No. 3 Automat Loaders.
2—Clarkson Loaders, 26" above rail.

CONVEYORS

2—Joy 30" Underground Belt Conveyors, 500' to 2000' each. Excellent.
1—Barber Greene 30" Belt Conveyor, 350', Excellent.
1—Robins 30" Belt Conveyor, 500'.
1—Jeffrey 52-B, 26" Conveyor, 1200' each.
1—Jeffrey 52-B, 30" Drive and Tail Assembly, complete.
3—Robins 26" tandem drive Belt Conveyors, 1,000' to 2,000' long. Excellent condition.
2—Joy MTB 30" Drive and Tail Assemblys, complete.
1—Goodman 97 HC 30" Drive and Tail Assembly, complete.
3,000' Conveyor Belt, 30".
2—61EW Elevating Conveyors.
2—61WH 15" Room Conveyors, 300'.
2—Joy 15" Room Conveyors, 300'.
2—Joy 20" Conveyors, 300'.
4—Joy Ladel UN-17 Shakers.
10—Goodman G-12½ and G-15 Shakers.
2—Long 400 DBH 15" Chain Conveyors, 25 H. P. Motors, new.
10,000' Conveyor Belt, 26", like new.

CONVERTERS AND DIESEL PLANTS

2—100KW, G.E. TCC-6's, 275 volt, Rotary Converters.
1—150KW, G.E. HCC-6, 275 volt, Rotary Converter.

CONVERTERS AND DIESEL PLANTS (Cont.)

1—150 KW, 6 phase, Allis Chalmers Rotary Converter, 275 volt DC, perfect.
1—200KW Allis Chalmers Rotary Converter, 6 phase, 275 DC, perfect.
1—200KW, G.E. HCC-6 Rotary Converter, 275 volt DC.
1—300KW, G.E. HCC-6 Rotary Converters, 275 DC.
2—300KW Westinghouse, 6 phase, Rotary Converters, 275 volt DC.
1—375KW Westinghouse Rotary Converter, 275 volt.
2—500KW Westinghouse Rotary Converters, 275 volt DC.
2—200KW Westinghouse Rotary Converter, 275 DC.
(all the above with 6900/13000 and/or 2300/4000 primary transformers)
2—150KW MG Sets, General Electric and Westinghouse.
1—200KW MG Set, Westinghouse, rebuilt.
1—200KW MG Set, General Electric, perfect.
2—150KW Allis Chalmers MG Sets, 275 DC volt, excellent, 220/440 AC volt.
1—300KW Westinghouse 600 volt MG Set, rebuilt.
2—300KW Westinghouse, 600 volt, 6 phase, Rotary Converters.
2—500KW Westinghouse, 600 volt, DC, 6 phase, Rotary Converters.
2—500KW HCC-6 Rotary Converter, 6 phase, 600 volt DC.
1—Cummins 125 KW, Diesel with 250 volt DC Generator.
1—Allis Chalmers Natural Gas Engine with 100KW Generator, 275 volt DC.
1—700 H.P. Shaft Hoist, complete.
Complete steam plant, will sell all or any part.
Boilers, like new, 1100 H.P. and 500 H.P. Also transformers, turbines, etc.
1—Complete Tipple with Cleaning Plant.

MISCELLANEOUS

2—All Steel Armco Buildings, various sizes.
20—Jeffrey Malveyors on rubber tires.
1—¾ Yard Shovel and Back-Hoe.
1—¾ Yard Crane on Cats.
Battery Supply Tractors, rubber tired.
1—Centrell Air Compressor on rubber tires.
10—Air Compressors, 1 H.P. to 40 H.P.
2—Joy self propelled rubber tired compressors, 240 cu. ft.
2—Acme self propelled rubber tired compressors, 130 cu. ft.
40 Mine Pumps, all types.
1—Differential 40 Passenger Man-Trip Car.
6—MSA Rock Dusters.
2—Phillips Carriers, 44" and 48" Ga.
2—Barber Greene self propelled Bucket Elevators.
Pipe, Plastic, Steel, Transit, all sizes 1" to 6".
100 Mine Cars, drop bottom, 42" Ga.
30 Mine Cars, drop bottom, 44" Ga.
100 Mine Cars, 18" high, end dump, 44" Ga.
300 Mine Cars, end dump and drop bottom, 20" high, 48" Ga.
1—10 ton Mine Car Scale with Recorder.
15—Brown Fayro HKL and HG Car Spotters.
1—12 ton Differential Slate Larry.
Incline Hoists, 25 to 50 H.P.
1—Jeffrey 6' Aerodyne Fan.
1—Jeffrey 8' Aerodyne Fan.
2—Storage Tanks, 4,000 Gallon.
10,000 Five Gallon O. I. Cans, screw lids.
800 tons Relaying Rail 25# to 80#.
10 tons Copper Trolley and Feeder.
300 Transformers from 1 to 2,000 KVA, 110 to 13,000 primary volts.
400 Electric Motors, 3 to 250 H.P.
Huge stock of mine supplies.
Thousands of Other Items.
600—MSA Mine Lamps, Chargers, etc.
1—Saw Mill—Complete.
1—Fricke

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RAVEN MINING EQUIPMENT COMPANY

Good Used Equipment—Priced to Save You Money

"THE FOLKS WHO KNOW—ARE DEALING WITH "RAMECO"

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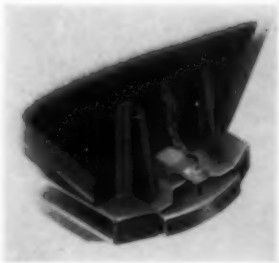
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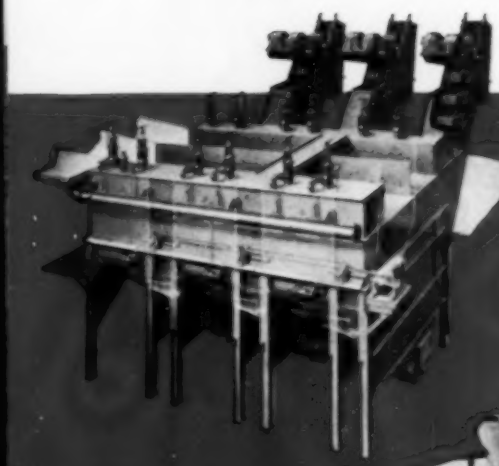
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Any seam..any market-

One of these 3 Link-Belt coal washers will give you the most economical cleaning



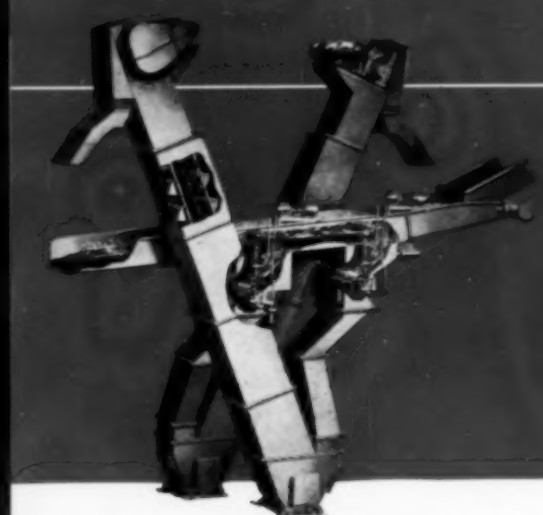
1. AIR-PULSATED WASHBOX

Extremely flexible for high-capacity cleaning of sized or unsized coal, Link-Belt air-pulsated washers are available in single and double bed models to satisfy all capacity requirements. The new dual bed model (pictured) has higher capacity due to increased washing bed width and individual bed controls . . . provides sharper separation over the entire washing area. Both models can incorporate the new Aeropoise refuse control for completely automatic refuse discharge.



2. FLOAT-SINK CONCENTRATOR

Utilizes the heavy-media separation process in a magnetite and water mixture. Efficient for extremely high or low specific gravity separation . . . when a large percentage of coal is near the separation gravity . . . when amount of impurities in feed fluctuates or product must be quickly changed. Cleans larger sizes, minimizing manual picking. Pictured is the Link-Belt tank-type, float-sink concentrator. Drum-type is available to suit varying coal conditions.



3. TROUGH SEPARATOR

The Link-Belt trough separator is used in combination with the air-pulsated washbox to handle large tonnages requiring more than one washer, with little added investment or operating expense. Trough floats off a large part of the coal, so clean that it requires no further treatment. The remaining portion, a mixture of coal and refuse, is fed to the air-pulsated washer for final refuse removal.

JOIN the many progressive mine operators who have found Link-Belt washers the answer to today's exacting coal specifications. Our engineers will be glad to work with you and your consultants . . . help you choose the right equipment for a cleaner, more marketable coal at lower cost.

LINK-BELT

COAL PREPARATION AND HANDLING EQUIPMENT

LINK-BELT COMPANY: Chicago 9, Birmingham 3, Cleveland 20, Denver 2, Detroit 4, Huntington 9, W. Va., Indianapolis 6, Kansas City 8, Mo., Lousville 2, Pittsburgh 13, Seattle 4, St. Louis 1, Scarboro (Toronto 13), Springs (South Africa). 14,724